

THE IRON AGE

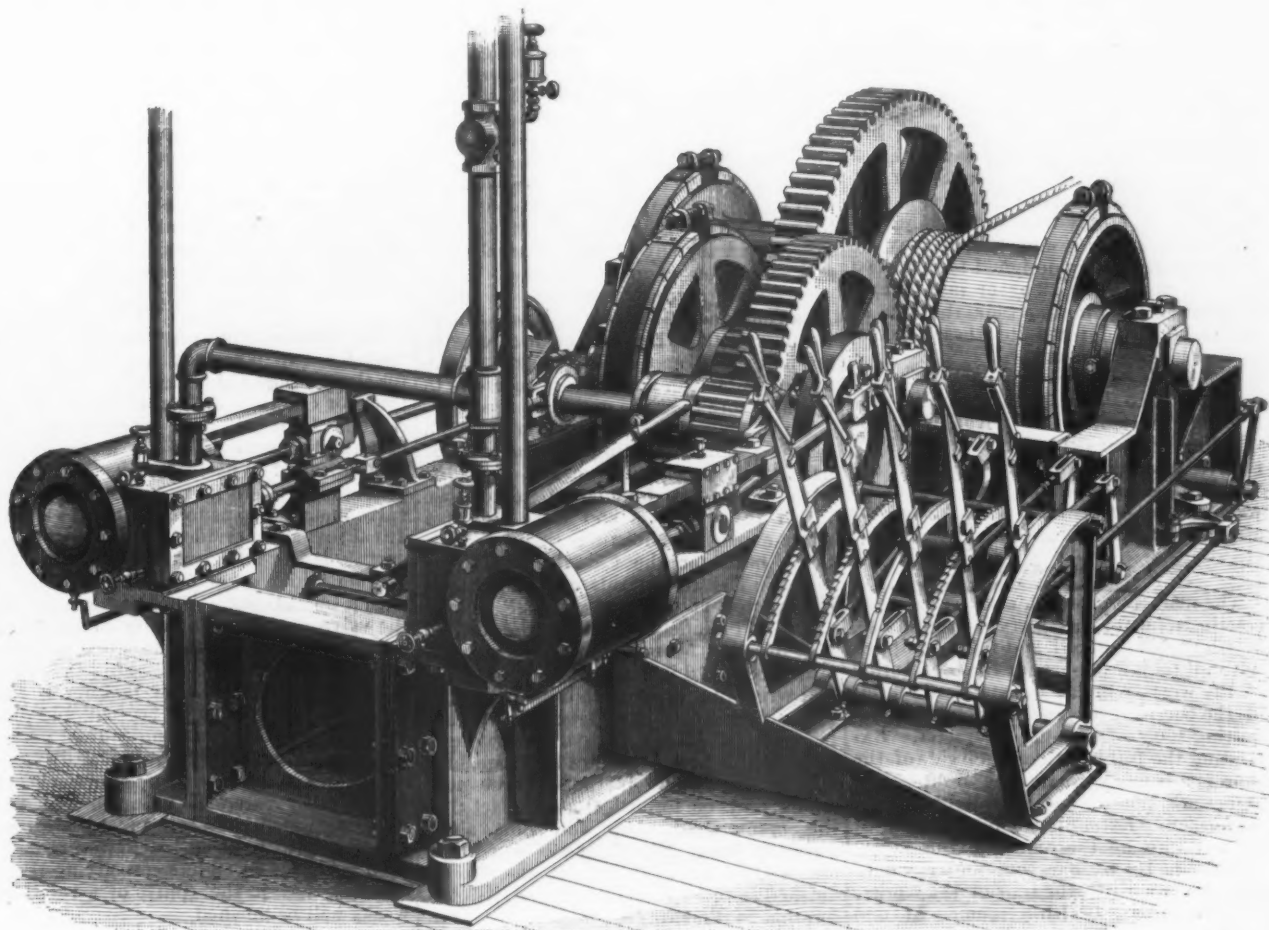
THURSDAY, JANUARY 22, 1891

Hoisting Engine.

The engine shown in the accompanying illustration is designed to meet the growing demand of quarrymen for a compound geared heavy hoisting engine to lift large blocks and to operate two or more derricks. The cut was made from a photograph of the first engine of this description built. As will be seen, the machine has two distinct reversible link-motion engines coupled to each end of the crank shaft. On the shaft is a pinion having a spiral jaw clutch hub, which engages with a jaw clutch sliding on a

1 to 75 feet per minute. The speed of the engine is controlled by the engineer at the throttle valve, so that with a light load the speed may be fast, while a heavy load may be started slowly and then the speed increased as desired. Steam is only used when the engine is working, and, therefore, economical results are obtained in the use of fuel. After a hoist has been made the load, if it be less than 2 tons, can be lowered by means of the brake on the drum, while if greater than 2 tons the clutch on the crank shaft can be disengaged, when the brake on the second

Deutscher Eisenhuettenleute who were in this country last October. Alexander Thielen briefly described the Southern trip, while J. Schlink spoke on the manufacture of pig iron, and A. Schilling dealt with the iron industry of the South. Dr. Wedding spoke chiefly on the coal and ore handling machinery. A number of speakers took part in a discussion of the wages question in the United States, the capacity for turning out work evidently being the subject of general amazement. D. Spannagel of Pubrost took up rolling mill machinery, dwelling particularly on the plant at the Edgar-Thomson, Homestead



NEW HOISTING ENGINE, BUILT BY LIDGERWOOD MFG. CO.

feather. This clutch pinion meshes with the gear on a second shaft, which carries, in addition to the gear, a differential band-brake wheel and a second pinion which drives the main-drum shaft gear. This gear is keyed fast to the center of a hammered-steel shaft 8½ inches in diameter in the center and 6 inches in diameter in the bearings. On the shaft are mounted two drums, one each side of the main gear. These drums have clutches bolted to their faces which are adapted to engage similar clutches sliding on a feather in the shaft. Each drum has a differential band brake. These brakes are operated by levers arranged in a rack, as shown in the illustration. It will be noted that every movement of the engine is controlled by the engineer from a central position.

The engine is made in two sizes, one to hoist 15 tons, the other 25 tons. It will hoist 15 tons on a single line of rope at a speed of anything from

shaft can be brought into play to control the lowering. While this brake is powerful enough to lower anything the engine can hoist, the other two brakes could be used if desired. This engine, which is built by the Lidgerwood Mfg. Company, of 94 Liberty street, New York, has been applied in quarry work for hoisting granite and marble, and has also been applied to the drawing of coal cars up inclines in coal yards, while a more recent application of it has been as a ballast unloader, where it has proved to possess many advantages, especially during winter months, when the material to be unloaded as well as the rails are more or less affected by frost. The drums are not usually lagged with wood, as shown, but some prefer the wood and it is put on when desired.

A great meeting seems to have gathered at Dusseldorf on December 21 to listen to the reports of those members of the Verein

South Chicago, Cambria, and other works. The reports were nearly all descriptive in their character, and rarely critical, so that they contain little which is likely to interest American readers. We may note that Dr. Wedding gave a very interesting and more general account of his trip before the Berlin Verein zur Beförderung des Gewerbfleißes in Preussen.

With but one or two trivial exceptions, the cables of the world, which stretch a length of 120,000 nautical miles, and have cost \$200,000,000, are of British construction. French manufacturers now propose to impose a heavy duty on cables imported into the country, which action appears to be directed against cables of American manufacture for land use, as an order has recently been secured by one of our leading companies for no fewer than 50 cables, of a well-known type, for telegraphic use in Paris.

SHOP NOTES.

The Dickson Mfg. Co.

During the recent visit of a representative of *The Iron Age* to the Dickson Mfg. Company, at Scranton, Pa., the works were found to be extremely busy in all departments, having had an unusually successful year even in the history of this prosperous concern, and having orders well booked in advance for the coming year. It is always a pleasure to visit an establishment of this kind, because there is generally some work being carried on which differs widely from every-day machine-shop practice, either owing to the design of the machine itself or the methods employed in its construction. At the same time, the methods of conducting the regular work of the concern and the various little hints in appliances and management which tend to the more economical and more perfect execution of the work demand attention and well repay close study. During the visit referred to a few days since our expectations were fully realized, as we found upon the floor and distributed through the shop several cases of special machinery not found in the usual line. It is these instances which depart so essentially from the turning out of standard tools, and which may be classed as machinery designed for a special purpose, and which may or may not be duplicated, that make a tour through an establishment devoted to these special productions so pleasant.

The Dickson Mfg. Company have in Scranton two large and practically distinct departments, one devoted to the building of their extensively known locomotives of all patterns, and the other devoted to general machine shop work. It was to the latter that we confined our attention at this time.

THE MAIN SHOP.

The main shop, which also serves as an erecting room for machinery of unusual size, is admirably lighted and fully equipped with all tools necessary for the prosecution of the work, whether the standard output of the company or special apparatus requiring tools of unusual character. Extending the full length of each side of the shop is a balcony where the lighter machines are placed and the lighter work performed. Extending across one end of the building are the offices of the superintendent, E. K. Sancton, under whose guidance we made the tour of the works, and the general drafting room. At one corner is the tool room. The check system is used, all preliminary work on the tool being done in the room, the men being allowed to grind their own tools when dull. Extending along each side of the main floor of the building and through each gallery is a main driving line of shafting. Each line of shafting on the lower floor is driven by a 12 x 12 double cylinder vertical engine, and each shaft of the two balconies is driven by a 10 x 12 double cylinder vertical engine. One of these engines also drives the square shaft of the Morgan crane, which travels the full length of the shop, 175 feet, has a lifting capacity of 25 tons and is capable of handling any load likely to be brought on the floor.

We may add here in parenthesis that steam for all the buildings is supplied from one plant, and that another boiler house is now being erected which will be equipped with four 60-inch diameter fire-box boilers of 150 horse-power each, of their own design and make. Foundations will also be provided for two more boilers. The new boiler house is so arranged that the coal is dumped directly in either of the doors, the ashes being dumped into a

pit under the middle and rear part of the boiler and the bottom of which is about on a level with the street, so as to make carting away very convenient.

We now return to the main shop. The exhaust steam from the four engines in the shop is led into a receiver, from which it is taken through heating pipes, distributed over the building, the amount of heat supplied being sufficient during the coldest weather to comfortably warm the whole building. The general objection to this method of heating has always been the excessive amount of back pressure on the engines. In the arrangement here found this has been overcome to such an extent that the back pressure amounts to only 3 pounds.

It would be a simple matter, owing to the arrangement of this building, to introduce and drive all the machinery from one central engine of large size, but it has been found that the distribution of the source of power to four points at the end of each of four main shafts has proved extremely convenient, and also economical. One of the best features of this arrangement is the convenience it affords when it is necessary to work overtime and when it is not essential that the whole shop should be in operation. It permits of the running of any of the four departments into which the shop is in reality divided independently of each and all of the others, and thereby allows of the selection and operation of only such tools as are necessary to perform the work in hand. As a consequence the loss of power due to turning shafts which are connected with machines not needed is reduced to the minimum, and in no case is it necessary to operate more than the one shaft needed.

On the main floor, the center of which between pillars holding the balcony is used as an erecting room and provided with the usual foundation plates, we found the cylinders and valve gear of a triple-expansion hoisting engine now being built for the Calumet and Hecla mines. The rest of this engine is being constructed at the works of I. P. Morris & Co. of Philadelphia. The cylinders are 20 $\frac{1}{2}$, 31 $\frac{1}{2}$ and 50 inches in diameter, the stroke being 48 inches. The crank shaft and wrist pin of the winding engine are of Krupp steel, the shaft being 22 inches in diameter in the journal and having a 10-inch hole bored through it. Some idea of the magnitude of the machine as a whole may be formed from the fact that the crank shaft, hub and pins alone weigh 27 tons. The shaft was bored here and the crank shrunk on. It was also refinished in order to make sure of its conforming to dimensions.

SHRINKING CRANKS AND DRIVING WRIST PINS.

In all the work of unusual size here done the wrist pins are forced in by means of hydraulic pressure. The pin and hole are bored with a taper of $\frac{1}{16}$ inch to the foot, and an allowance of $\frac{1}{16}$ inch is made for every inch in diameter of the hole. This is, of course, to provide for the crank firmly gripping the pin, which must expand the metal to that extent. A 12-inch pin would therefore be $\frac{1}{16}$ inch larger than the hole it would be forced into. Some 12-inch pins require the enormous pressure of 575 tons to get them down to place. A 12-inch pin was being forced in at the time of our visit, the general arrangement of the appliances for doing this being as follows: The crank was placed with the pin hole in a horizontal position, and across the back of the crank were placed heavy beams, to the projecting ends of which were attached by nuts extension rods, which extended to the opposite side of the cylinder of the hydraulic ram. The pin being put in place, the plunger of the ram, which was 16 inches in diameter, was forced forward,

water being supplied from a small pump operated by hand power. In this case the pressure required, as indicated by the gauge on the supply pipe, was 35,000 pounds to the square inch in order to send the pin home.

In shrinking the crank on the shaft the crank is first finished all over, and is then heated in the yard adjoining the shop. When brought to the proper temperature to expand sufficiently to easily go on the shaft, which fact is ascertained by caliper, it is brought into the shop, slipped over the crank and allowed to cool. The whole operation is extremely simple, and has always given most satisfactory and successful results.

On the main floor was a

BLOWING ENGINE,

of their own design, being built for the Pulaski Iron and Coal Company of Virginia. In this engine the steam cylinder is 42 inches in diameter, the air cylinder 84 inches in diameter, the stroke being 42 inches. It is intended to run at from 25 to 35 revolutions per minute and to give an air pressure of from 7 to 10 pounds. It is provided with poppet valves and Stevens cut off. There was also on the floor a large ventilating fan for mines. Mining machinery, as might be expected from a firm located in the center of the coal mining region, forms a large part of the work of the company, and is one of the most important branches.

WHEELLOCK ENGINE.

The Dickson Company now have a contract for two Wheellock engines, 44 x 72, for the Chicago Cable Railway, and a contract for one engine 38 x 60 for the Third Avenue Railroad, New York City. An important change is to be made in the usual form of Wheellock valve, which, as our readers well know, is a cylindrical valve mounted so as to turn upon a cylindrical seat and provided with longitudinal ports. It is a valve easy to build, durable, and one which gives large steam passages with a small travel. The change made in the valve consists in reality of doubling one valve so as to do the work of two. This is accomplished by making the valve a full cylinder instead of making it the segment of a cylinder, as is usual, and providing a double set of longitudinal ports. In this way two valves are in reality obtained, while the work of equipping an engine with valves is reduced, and the working parts of the wrist plates are correspondingly reduced. Patterns have been made for an engine embodying these changes, and in the course of a very few weeks will be finished.

PORTABLE GEAR CUTTER.

All the large gears used in the machines built are made upon what we might call a portable gear cutter, which is extremely simple in construction, and which has given in operation remarkably good results. The gear cutter proper looks almost exactly like the head stock of a lathe, being provided with the usual gear and back gearing for heavy cuts. The front end of the spindle carries the milling cutter, in all work two cuts—a roughing and a finishing cut—being used. The teeth are spaced by hand. The gear cutter is mounted so that its spindle is radially in line with the wheel. What we may call the headstock is mounted upon a bed similar to a planer bed, and is provided with the necessary gearing in order to carry the tool across the face of the wheel. Power is led to the cone by belts passing over suitable idlers. In the case of a gear of comparatively small size the gear is taken to a small shop adjoining the main shop, which serves as the home of the gear cutter, but in the case of an extremely large gear, such as was used in the great sand wheel recently finished,

which had a diameter of 54 feet, the cutter is taken up and carried into the main shop, and there mounted in such position as to cut the gears of the big wheel. It is a case of the hill going to Mahomet or Mahomet going to the mountain, as may be most convenient for all concerned. The gear cutter, we may add, was built by Hewes & Phillips, of Newark, N. J. It will be seen that the whole arrangement is so elastic as to permit of doing almost any work.

FOUNDRIY.

In the foundry are two Morgan traveling cranes of 25 and 10 tons capacity, and having a span of 59 feet and a travel of 270 feet. The two cupolas are of sufficient capacity to cast the largest size work ever used in the shops. During our visit a pulley weighing 25,000 pounds, measuring in diameter 20 feet and 4 feet wide in the face, had just been cast. This department also makes all castings for the locomotive department, the one foundry serving for the requirements of the two establishments. Some little time since the foundry capacity being found to be insufficient, both end walls were extended to the dimensions given above. At one end are the core ovens, and opening from one side is the cleaning room, which is 30 x 90 and provided with two mast cranes. A standard gauge track leads from the foundry outside to a temporary storeroom, into which runs a standard track connecting with the railroad, thus providing all necessary conveniences for easy handling and shipping the work. In the storeroom is a 20-ton hand traveling crane. Next to the foundry is a brass foundry.

BOILER SHOP.

In this shop were found two hydraulic riveters and the usual punches, shears and bending rolls. All standard heads are flanged up in a press, odd or irregular shapes being flanged by hand. Just outside of the boiler shop is a long train of rolls capable of handling plates of unusual dimensions.

The smith shop has three steam hammers of 1000, 1500 and 2500 pounds.

SAND WHEEL.

The company have just finished and shipped to the Calumet and Hecla mines a mammoth sand wheel, made after designs by E. D. Leavitt, Jr. This was 54 feet in diameter, and weighed 200 tons. The wheel was built on the bicycle plan, the spokes leading from two hubs placed some distance apart, to the center rim of the wheel, which acts as a gear wheel into which the driving pinion meshes. At each side of the rim are placed the lifting buckets. The capacity of the wheel at a velocity of 10 feet per second, at the inner edge of the buckets, is 30,000,000 gallons of water and 2000 tons of sand every 24 hours. The journals are 22 inches in diameter, 3 feet 4 inches long, the total length of the shaft being 23½ feet. The inner part of the shaft has a diameter of 2½ feet. It is made of gun iron and bored. In the wheel are 432 cut teeth, the face being 18 inches and the pitch diameter 54 feet. Work has been begun upon a second wheel of identical design and dimensions.

LOCOMOTIVE SPECIFICATIONS.

Although we did not visit the locomotive department, owing to lack of time, Mr. Sancton kindly explained their method of sending descriptions of any of their standard locomotives. Up in the right-hand corner of a double sheet is pasted a photograph, 2 x 4 inches, of the engine which is described in the text. The general description, which is printed, except such parts as dimensions and special data, for which blank spaces are left, gives the gauge, weight, wheel base, diameter and

stroke, general dimensions and description of construction of boilers, dimensions of driving wheels, pistons, crosshead, rods, description of valve motion, feed-water arrangements, frame, engine truck, tender, and, in fact, all matter the intending purchaser of the locomotive would naturally desire to know. The photograph accompanying the specification adds most essentially to its value, since it conveys an accurate and very complete idea of the general arrangement of the engine described. We may add that at one end of the main machine shop is fitted up a dark room, where all work connected with photographing the many machines made is under the charge of H. Keller, Jr. All photographic work is done by the company, and the results obtained are exceptionally perfect.

The Lash and Johnson Direct Process.

Horace W. Lash, the well-known Pittsburgh metallurgist, and James Johnson have lately patented a direct process which embodies some features of special interest, the object being the production of a high carbon metal, as well as the ordinary metal usually produced in the direct process. Mr. Lash crushes the ore and the reducing agent independently to ½ inch mesh size. With the former he mixes about 20 to 30 per cent. of the latter and grinds them together until finely pulverized.

During this grinding operation the materials are moistened by the addition of fluid, so as to form a pasty mass or amalgam, the fluid employed being by preference of such a characteristic—*e. g.*, silicate of soda, coal tar, &c.—as will cause the materials to adhere together and harden or cake into a solid homogeneous mass when dried. The amalgam thus prepared is spread evenly over the hearth of a reverberatory open-hearth or other suitable furnace, and there subjected to the action of a hot reducing flame. The first action of the heat, owing to the binding material—*i. e.*, silicate of soda—is to harden and cement the materials into a homogeneous cake on the hearth of the furnace. After the material has hardened, as above stated, the charge is raised and broken up into irregular masses by a bar, permitting the heat to penetrate the entire mass, thus facilitating the chemical action and effecting a more complete absorption of carbon. A covering of pulverized glass and carbonaceous material (one-third carbon and two-thirds glass, more or less) is then scattered all over the charge. This material soon melts down, covering all the surfaces of the charge with a smooth uniform coating, thus preventing any oxidation either of the ore or carbon. In other words, this cover of carbon and glass plays precisely the same part as the cap or cover of a crucible—*i. e.*, prevents the escape and separation of the oxygen of the ore and the carbonic oxide from the carbonaceous material before they can combine. Until the glass has liquefied and coated the entire charge, as above stated, a hot reducing or deoxidizing heat is maintained in the furnace, but as soon as the protecting coating has been formed it is preferred to employ an oxidizing heat, as it facilitates by its increased temperature a more rapid evolution and subsequent combination of the gases from the ore and carbonaceous material. An elimination of the phosphorus and other deleterious substances in the gangue of the ore can be effected by this process by tapping or skimming off as soon as the slag becomes sufficiently fluid and before the bath is raised to a temperature at which the phosphorus and metallic iron combine, the phosphorus remaining in the slag as phosphoric acid is removed therewith.

A charge of the material, treated as hereinbefore stated, can be brought to a liquid condition in a suitable open-hearth furnace—as, for example, one of the Lash type—in four or five hours, and if the ore and carbonaceous material have been commingled in proper proportions, the bath will then contain from 3.80 to 4.56 per cent. of combined carbon, and the iron will show a highly crystalline fracture of a blue-gray color.

The inventors state that by this process any desired carbon in any or all heats may be obtained by adding ore to the bath when it is desired to reduce the carbon, or by adding further amounts of the amalgam, prepared with a higher percentage of carbon, when it is desired to increase the carbon in the bath. For the production of high-carbon metal a suitable proportion of lamp black may be employed in the preparation of the amalgam.

A New Steel Car.

The Steel Car Company had on exhibition last week at the Rock Island Depot, Chicago, one of their new steel passenger cars. It is cylindrical in form and is constructed entirely of steel, the only wood about it being the doors at the ends. It is the private car of officers of the company, and was the first steel car built. The plates of which it is constructed are from ½ to ¾ inch in thickness, riveted to ribs of quarter-column steel. It is contended that the car cannot be broken up in a collision, that it is absolutely fire proof, is lighter than wooden cars, and has three-quarters of its weight below its vertical center, insuring steady riding. Its measurements are standard. The absence of any woodwork gives no chance for splinters to wound persons in case of an accident. It is claimed that the life of this car will prove to be longer than that of a wooden one, that it costs much less to repair it, and that it is from 10 to 15 tons lighter than the heaviest parlor and sleeping cars, and, finally, that its original cost is no more than that of a wooden car.

The object of the trip of the car and officers of the company is to locate a plant for the manufacture of cars. It is proposed to build whole trains of steel baggage, mail, express, and passenger cars, and also to build steel freight cars that will cost no more than the best wooden ones, and have double their carrying capacity. The interior of the car now on exhibition here is padded with curled hair, so that if it rolled down an embankment its passengers would strike against cushions. It is divided into compartments which can be thrown into one, or separated into bedrooms, sitting rooms, &c. There are no berths to be let down from the sides. The car was built by the Boston Steel Car Company, who two years ago built a large plant at St. Joseph, Mo. One car was completed and ten more contracted for and in course of construction when the plant burned. The company were then reorganized as the Steel Car Company, by H. D. Perky, the organizer of the Mineral Exposition in Denver in 1892, and of the St. Joseph Cereal Exposition in 1889. The headquarters of the new company are in the Pulitzer Building, New York.

James B. D'Arcy Bolton of Jersey City, N. J., has designed a modification of his well-known apparatus for casting solid ingots, so as to adapt it to the casting of tubular ingots.

Our attention has been called to a very elaborate and thorough series of papers on the calculation of blast-furnace slags, presented before the American Chemical Society by Auguste J. Rossi of 35 Broadway, New York.

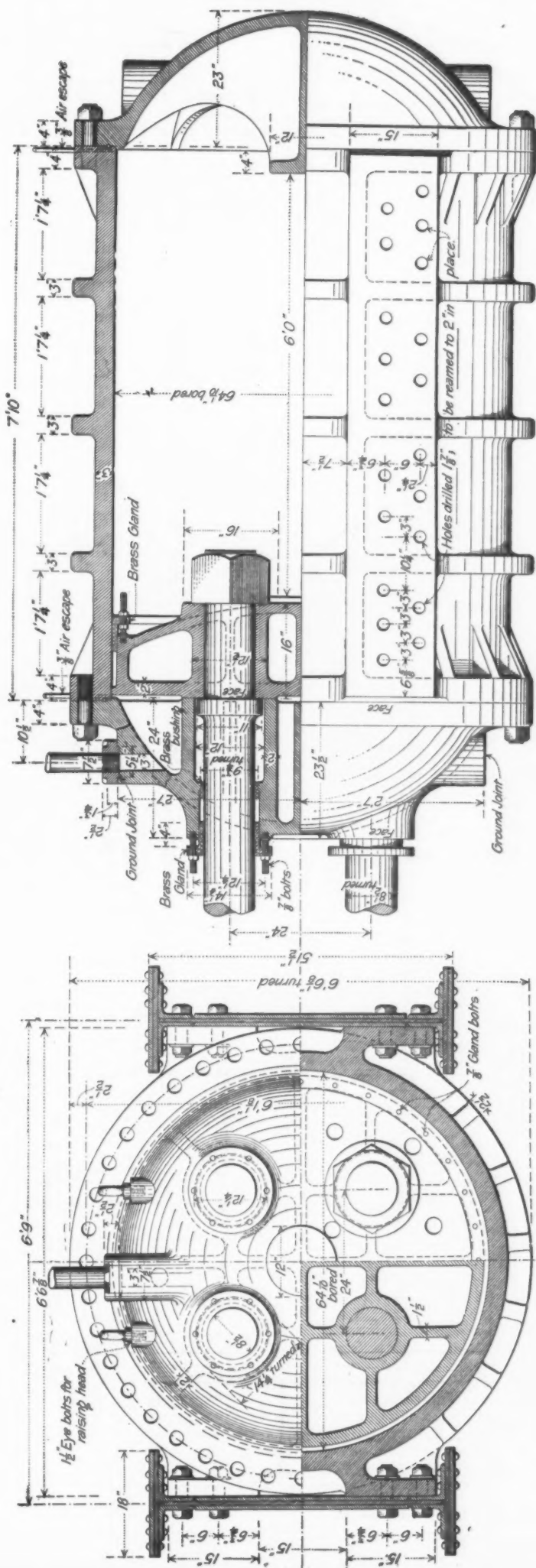


Fig. 4.—Part End Elevation, Section through Cylinder and Section through Piston.

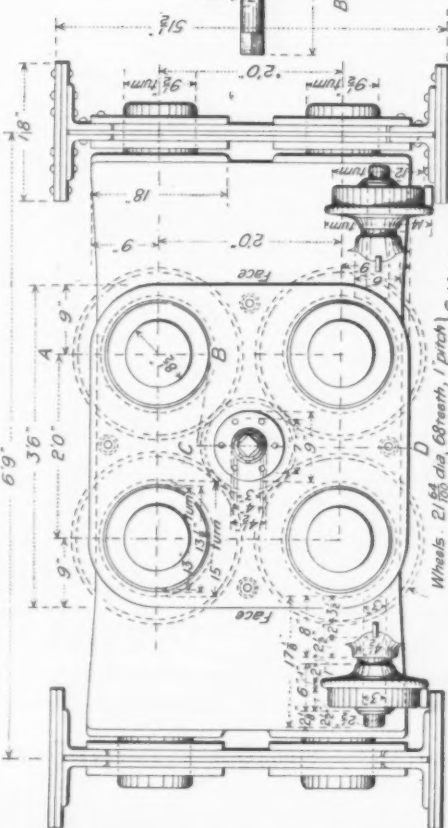


Fig. 6.—Rear End Elevation.

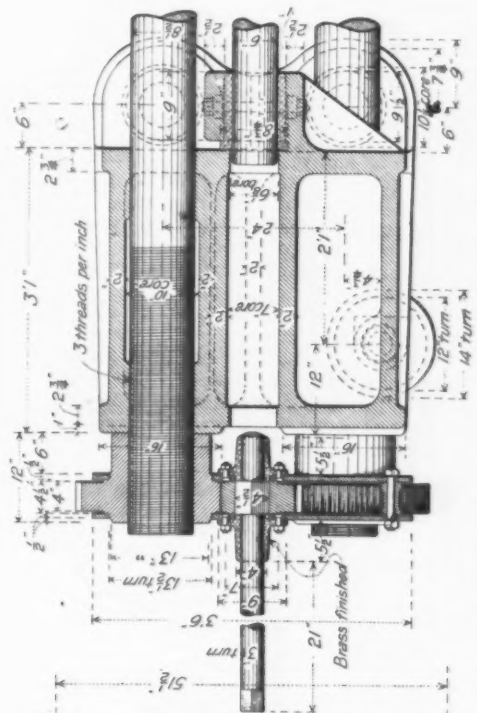


Fig. 7.—Vertical Section of Tail Stock through A^*B and CD of Fig. 6.

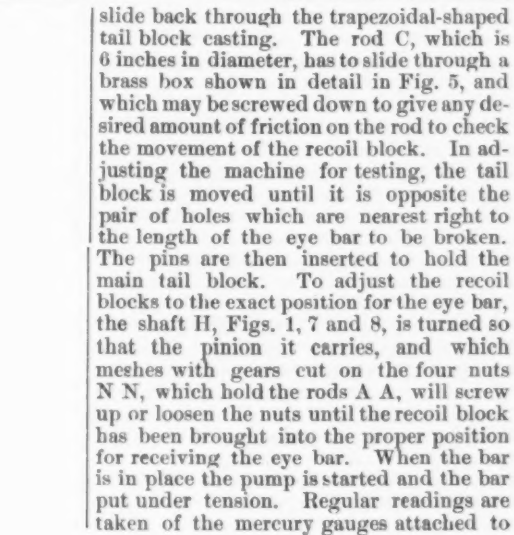


Fig. 5.—Sectional Side Elevation.

slide back through the trapezoidal-shaped tail block casting. The rod C, which is 6 inches in diameter, has to slide through a brass box shown in detail in Fig. 5, and which may be screwed down to give any desired amount of friction on the rod to check the movement of the recoil block. In adjusting the machine for testing, the tail block is moved until it is opposite the pair of holes which are nearest right to the length of the eye bar to be broken. The pins are then inserted to hold the main tail block. To adjust the recoil blocks to the exact position for the eye bar, the shaft H, Figs. 1, 7 and 8, is turned so that the pinion it carries, and which meshes with gears cut on the four nuts N N, which hold the rods A A, will screw up or loosen the nuts until the recoil block has been brought into the proper position for receiving the eye bar. When the bar is in place the pump is started and the bar put under tension. Regular readings are taken of the mercury gauges attached to

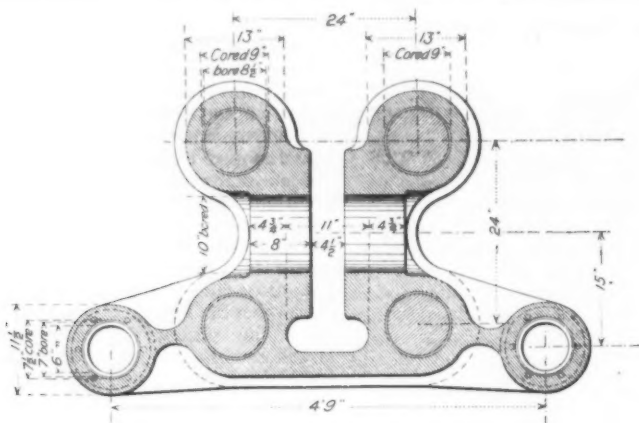


Fig. 10.—Head Block.—Section through Pin Hole.

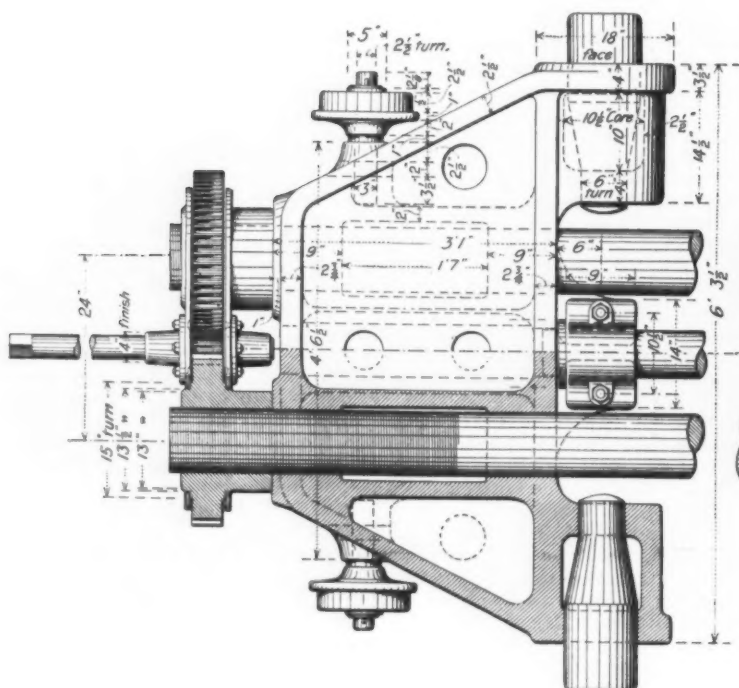


Fig. 8.—Tail Block.

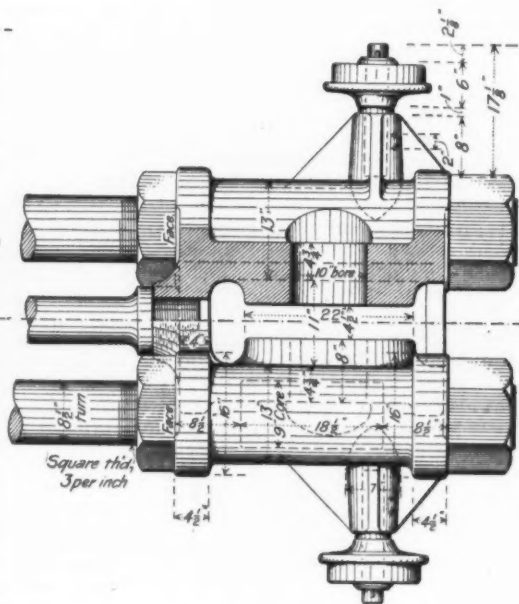


Fig. 9.—Recoil Block.

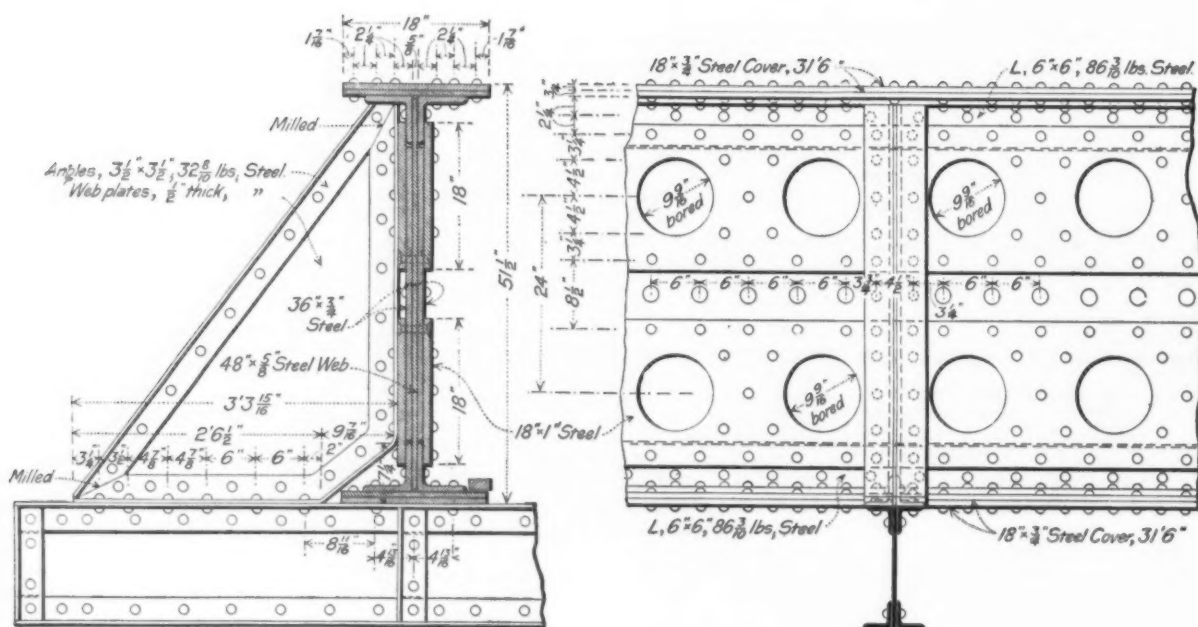


Fig. 11.—Details of Side Girder and Bracket.

the cylinder and measurements are made at the same time of the elongation of the bar between fixed points.

As is well known, perhaps the most important point connected with the construction of a hydraulic testing machine is the method of packing the rod and piston. The usual method of packing a piston to be subjected to great pressure of water has been to insert a ring of leather or rubber having a V-shaped section. As the water comes in contact with this, entering, of course, the base of the V, it forces the sides apart, forming a tight joint. The objection to this form of packing in a testing machine is the impossibility of measuring the amount of friction exerted by the packing on the walls of the cylinder, this friction, of course, increasing directly as the pressure. In the Athens machine the piston packing consisted of copper wire set up by a brass gland and packing bolts

with thread and nut adjustment, until the leakage under maximum pressure is reduced to a thin film of water discharging uniformly between the piston and cylinder. The friction by this construction is reduced to a minimum and is less under maximum pressure than when the water is first introduced. Owing to the absence of the back cylinder head on the Athens machine this film of water could be observed. It was noted in that machine that it required about 4000 tons total pressure to run the piston to its initial position, and that therefore this amount was assumed to represent the maximum reduction which should be made as compensation for fractional resistance. It was believed that this was a constant quantity, and since it represented scarcely one-third of 1 per cent. of the high strain indicated by the gauges, it could be disregarded for all practical purposes. The same packing is introduced in the present machine. In this machine the cylinder heads and piston are of cast steel, copper wire being the only gasket used.

This machine is the direct outcome of the demand for a machine capable of testing full-sized bridge members. In designing it extreme accuracy, such as characterizes the Watertown testing machine, was not aimed at. It was built with power and strength sufficient to test to destruction members of full sections, and to furnish thereby data not otherwise obtainable. It will work up to a duty of 2,160,000 pounds, to obtain which requires a pressure of 720 pounds per square inch on the piston area, but it can be worked safely at 800 pounds water pressure, which would correspond to a load on the piston of 2,400,000 pounds. The Athens machine has been remodeled, and now has a capacity of from 800,000 to 1,000,000 pounds. Since this machine will take in an eye bar 50 feet long, and since the stroke of the piston is 6 feet, the power under test must, in order to resist fracture, stand an elongation of at least 12 per cent. in its total length.

The following data clearly illustrates the behavior of the large eye bar when tested to destruction:

Test of No. 6, Phoenixville, Pa., August 4, 1890. Full-Sized Test of 10 x 1 1/4 inch Steel Eye Bar. Rolled by Phoenix Iron Company. Manufactured by Phoenix Iron Company.

Length out to out of pin holes:
Before breaking: 25.49 feet. After breaking, 30.01 feet.
Head A: Dimensions, 13.64 inches x 1.98 inches. Excess, 46 per cent.
Head B: Dimensions, 14.52 inches x 1.86 inches. Excess, 46 per cent.
Pin hole A: Diameter, 8.66 inches. Elongation, 1.56 inches.
Pin hole B: Diameter, 8.66 inches. Elongation, 1.78 inches.
Nominal section: 10 inches x 1 1/4 inches.
Actual section, 9.94 inches x 1.86 inches.
Original area: 18.49 square inches. Fractured area, 9.65 square inches.
Gauge reading for elastic limit, 175 = 525,000 pounds.
Gauge reading for ultimate strength, 310 = 930,000 pounds.
Elongation: In 12 inches, 5.06 inches; in 21 feet, 4.12 feet.
Elastic limit: 28,300 pounds per square inch.
Ultimate strength, 50,290 pounds per square inch.
Elongation: In 12 inches, 42.1 per cent; in 21 feet, 19.6 per cent.
Reduction of area, 47.8 per cent.
Fracture: Irregular, silky.

Remarks.

Time of breaking, 30 minutes.
Elongation in each foot (along the 20 feet length of the body of the bar where the elongation was measured): 2.18 inches, 2.15 inches, 3.40 inches (broke), 5.06 inches, 2.70 inches, 2.40 inches, 2.90 inches, 2.58 inches, 2.18 inches, 2.00 inches, 1.96 inches, 2.00 inches, 1.90 inches, 1.80 inches, 2.48 inches, 2.54 inches, 2.06 inches, 1.80 inches, 1.78 inches, 1.90 inches, 1.20 inches.

The Jones direct process was experimentally tested in Brooklyn last week.

The Electric Magnetic Reciprocating Engine.*

BY CHAS. J. VAN DEPOELE, LYNN, MASS.

One of the recent developments in the electric line is the perfection of a new electric-magnetic reciprocating engine.

For years past, and, indeed, ever since electricity was first used to magnetize an iron bar by means of a coil of wire, the idea of producing a reciprocating motion by the electric current has been entertained, and many unsuccessful attempts have been made to construct and operate such machines.

It is a well-known fact that when a current is made to flow through a coil of copper wire, or what may be termed a solenoid, a bar of iron placed near the ends of such a coil will be sucked into the solenoid, and the moment the current is broken the plunger or iron bar will be dropped by its own weight, or may be expelled by means of springs if the machine is in any other position than vertical. This principle, however beautiful, could never be successfully applied in the construction of heavy machinery on account of the make and break of the circuit, which has to take place in order to produce the pulsations of the current which causes the pulling and letting go of the plunger.

Not until the invention and construction by the writer of an electric generator, which would give currents rising and falling at a definite speed, could the current be sent to the coils of a reciprocating engine, there alternately attracting and repelling its plunger. In this apparatus, however, as will be seen later on, the rising and falling of the current is produced in such a way that it is absolutely certain that no spark is produced either in the machine or in the generator producing the current. The current is caused to rise and fall in closed circuits, and actuates the plunger of the reciprocating engine with a speed corresponding absolutely to the speed of the defined rise and fall of currents produced by the generator. Thus, the generator can be caused to produce, say 400 pulsations of current a minute, or it can be made to produce either a higher or lower number than this, so that the engine's speed can be regulated according to the size of its piston and the work it has to do.

The engine itself is a simple piece of machinery, consisting of two or more coils of copper wire or solenoids, incased in an iron envelope protecting them from outside injury. Within these coils is placed a brass tube, and within this an iron plunger, capable of moving to and fro under the action of the currents in the coils. To the end of this iron plunger is attached a piston rod, similar to that of an ordinary engine, and to this is attached the hammer, drill or whatever tool is to be operated by the engine.

A very simple means of connecting the reciprocating engine to the current, is applied to the machine, so that it can be stopped and started instantly. The cables leading from the generating station to where the current is to be used, are perfectly insulated in the usual manner, and switch-boxes are disposed along the main cables. From these, flexible cables are led to the reciprocating machine, so that it can be moved, if necessary, from one place to another, without any trouble whatever. The cable is incased in a rubber tube to protect it from injury and to prevent loss of current by contact with the ground.

It will readily be seen that one of the first applications of these machines will be to rock drills, such as are now in use in

nearly all mining and rock work, for quarrying, prospecting, &c. The simplicity of the machine lends itself most readily to this application, as it will be seen that there are no movable parts on the whole machine, except the plunger and piston-rod carrying the tool. There are no valves, as in steam engines, no switches, no make and break of the circuit, and no exposed current-carrying parts, so that the whole can be handled with safety and without any skill above that of common laborers. By turning on the switch the machine is started; by turning off the current, it is stopped. There is absolutely nothing to be done to the machine, except occasionally to pour in a few drops of oil, to lubricate the piston and its rod.

For ordinary mining work the drill is mounted on a tripod similar to that now in use with the steam and air drills which are well known to-day, or it can be attached to horizontal bars or to vertical columns; in fact, it lends itself to absolutely the same work as has been done heretofore by the air and steam drills. It will work in any position, from horizontal to vertical. The weight of these drills will be approximately the same as that of the steam or air drills of the same capacity, and everything is so arranged that the men accustomed to work the latter machines will find no difficulty in operating the new electric drills.

The apparatus for generating currents to operate these drills or electro magnetic engines, can be placed at any distance from where the drills are at work, and any number of drills can be worked from the same source, each drill working independently of the other, and whether one or more are in operation, the generator will regulate and furnish a current exactly proportional to the demand.

Where a long distance exists between the generator and the place where the current is to be distributed, a system of conversion is used—that is, the current is changed from a high to a low potential, so that the primary current, transmitting the power from the prime motor, can be of a high tension. Since this current could be guarded against possible contact, there would be no danger in using high voltage. At the point of application the high potential is converted to a low potential of such pressure only as may be found desirable and practicable. Where the distance is—say, only 1 or 2 miles, it will not be necessary to use any system of conversion whatever, as a current of suitable potential can be run directly from the generator to the mines.

The main advantage, however, is the superior economy over the motors now in use where steam or air is to be conveyed to a distance of only a few hundred feet. There is an enormous loss in this transmission, and methods of steam or air transmission are certainly very limited in scope. There is also the trouble of leakage, making a system of piping much more costly in maintenance; but this is done away with when electricity is employed. All parts are so simple that they will require little or no repair for very long terms, and such repairs as will have to be made will always be much less expensive than in the case of steam or air driven machines.

The range and penetrating power of modern rifles is tremendous. The 10-inch rifle which the Miantonomoh now carries at the Navy Yard will pierce 21 inches of iron at a distance of 1000 yards. The 6-inch American rifle will drive its projectile through 10 1/2 inches of wrought iron at 1000 yards. The 8-inch rifle will pierce 16.3 inches of iron at the same distance. The 12-inch rifle will penetrate 28 inches of iron at the same distance.

* Read before the American Institute of Mining Engineers.

The Proposed Denver Steel Works.

At a recent meeting of the Denver Manufacturers' Exchange, J. W. Nesmith, president of the Colorado Iron Works, delivered the following address:

The enlightened, judicious and comprehensive management of our proposed iron and steel works is of no less importance to our city and State than is their inauguration and establishment. It is not enough for our greatest benefit that such manufactory be conducted solely for the direct financial interest of its promoters without reference to the means to be employed for realizing its profits. This enterprise would be of comparatively small benefit to the community were it inaugurated on a very limited basis as to capacity for production, and so protected by a railroad pool as that it would be able to market its whole product at about Eastern prices with a high rate of freight added, for in that case our manufactories which use iron and steel material would have the whole East to compete against in our own local market, with no advantage as to cost of material, because Eastern competitors would be able to ship their commodities in here about as cheaply as our own manufacturers could bring in their material for manufacturing such commodities here, and just such are existing conditions, and just such they have ever been in Colorado. Our cost price for iron and steel material with which to carry on manufacturing in this State is, and always has been, governed by Eastern prices of such material, with freight from the East to Colorado added.

While it must be the aim to inaugurate and manage the iron and steel enterprise to the best interests of those who promote it and invest their money in it, the policy of business management should be a comprehensive one, to include the greatest general benefit to the community consistent with the best interests of the stockholders. It should be of such capacity and on such a scale and conducted on such a basis as to include the supply of iron and steel material not alone to a local market of comparatively narrow limits, but to a great market within wide limits; and to this end the scale of prices and the capacity for production would necessarily be so formulated as to make wide distribution in competition with Eastern producers practicable, and on such basis our own consumers of our products, those located in our own city or its vicinity, would be placed in the advantage of all competitors in their various lines of manufacture, and thus great manufactories of all classes using iron and steel material would be made possible and profitable here.

As we have the materials for the production of iron and steel commodities here at lower cost than such commodities are produced elsewhere, our policy should comprehend production on a large scale and distribution within wide limits of territory, and by this policy our customers, the consumers of our products here at home, the manufacturers of all classes of machinery, appliances and commodities involving the use of iron and steel wholly or chiefly in their construction, would be able to compete with their products in territory bounded by no narrower limits than our own for the material which we shall produce.

Furnaces and mills for the production of pig iron, bar iron, beams, sheets and plates of iron and steel are of importance then to our city in proportion as they make possible by the comparatively low cost of such material the profitable manufacture of all or most important articles, machinery and appliances in the production of which iron and steel material are the principal constituents and as to importance of such manufactories. Suppose car works

here on a paying basis, then on each 1000-car contract which they would execute \$500,000 is distributed in our community by that concern, besides that expended here by the steel and iron company in producing the iron used in the manufacture of the cars.

Thousand-car contracts are not very uncommon, and when we build cars as cheaply here as do Eastern builders, then we may have some such and many lesser every year from our tributary 35,000 miles of railroad, and so that industry alone would distribute its millions every year among us. Like results and of parallel importance may be attained in many other branches if iron and steel are sold in our market at about average prices of such material in the Middle and Western States.

This important point must be kept prominently in view, and no proposition for iron and steel works entertained or encouraged which does not contemplate the furnishing of iron and steel over a wide range of territory to general manufacturers at such cost as will enable them to compete in the market with their products and commodities, for the manufactories that come after and are made possible by the low cost production of iron and steel are of more importance to the community and will keep more money in circulation than would the steel and iron works without such following manufactories.

It is believed that a move is already being made in this direction, for it is reported on good authority that the Colorado Coal and Iron Company's iron and steel works at Pueblo are to be thoroughly overhauled and a reorganization of appliances and equipment is to be made. Two new smelting furnaces are to be built, which will make four in all, which will give a capacity, it is said, of 500 tons per day of pig iron. The old 3-ton converters are to be replaced by larger ones. Metal is to be taken direct from the furnaces to the converters and blown into steel without remelting. A soaking pit is to be provided for producing the proper uniform heat of ingots throughout their whole dimensions before their passage through the breaking-down rolls.

Pueblo, the State at large and the Colorado Coal and Iron Company are to be congratulated on this important improvement if it is consummated.

Five hundred tons of pig iron per day, then, may hereafter be the Colorado Coal and Iron Company's pig iron producing capacity. This would equal 175,000 tons in a year of 350 days' run. As the per capita consumption of pig iron in the United States averages something like 1 ton for each seven persons, and with an output as above estimated, the Pueblo mills could thus supply iron and steel material to 1,225,000 people, or less than one-sixth of the population west of the Missouri River. As there are 8,000,000 people west of the Missouri, we have thus 6,750,000 unprovided for and which we should supply, assuming, of course, that we can produce iron and steel at lower cost than can any city east of the Missouri River, which we can surely do.

There appears to be room, then, for a pretty extensive concern, and it does not appear that there need be the least friction or unhealthy competition between steel works in Colorado until the production surpasses by many times that already provided for in the State, so long as they adhere rigidly to the proposition, by producing and selling here at Chicago and Pittsburgh cost and prices, and if we want the smoke cloud which hovers over our city increased to many times its present dimensions, it is on these lines we must proceed.

The Ewald Iron Company, St. Louis, Mo., have had recently tested by J. B. Johnson, professor civil engineer at Wash-

ington University, St. Louis, two specimens of Tennessee bloom stay-bolt iron, with the following result:

Laboratory No.	1,251	1,252
Marks	2	3
Size of reduced or tested section	93 dia. 4.7	1-12 dia. 4.7
Area in square inches	0.6793	0.9852
Broke in at pounds	35,725	50,950
Breaking strength per square inch in pounds	51,100	51,720
Limit of elasticity in pounds per square inch	↑	↑
Elongation of reduced section	35,700	32,000
Per cent. of elongation	1.44	1.31
Area of reduced section	36.0	32.8
Per cent. of reduction	0.3068	0.4902
	55	50

This iron was manufactured by the Tennessee Rolling Mills, Louisville, Ky., operated by Ewald Iron Company, St. Louis.

The Senate Silver Bill.

The text of the Silver bill as it passed the Senate is as follows:

An act to provide for the free coinage of gold and silver bullion, and for other purposes.

Section 1. That from and after the date of the passage of this act the unit of value in the United States shall be the dollar, and the same may be coined of 412½ grains of standard silver, or of 25 and ⅞ grains of standard gold; and the said coins shall be legal tender for all debts—public and private. That hereafter any owner of silver or gold bullion may deposit the same at any mint of the United States to be formed into standard dollars or bars for his benefit and without charge; but it shall be lawful to refuse any deposit of less value than \$100 or any bullion so base as to be unsuitable for the operations of the mint.

Sec. 2. That the provision of Section 3 of "An act to authorize the coinage of the standard silver dollar, and to restore its legal tender character," which became a law February 28, 1878, is hereby made applicable to the coinage in this act provided for.

Sec. 3. That the certificates provided for in the second section of this act shall be of denominations of not less than \$1 nor more than \$100, and such certificates shall be redeemable in coin of standard value. A sufficient sum to carry out the provisions of this act is hereby appropriated out of any money in the Treasury not otherwise appropriated. So much of the act of July 14, 1890, entitled "An act directing the purchase of silver bullion and the issue of Treasury notes and for other purposes" as requires the purchase of 4,500,000 ounces of silver bullion per month be and the same is hereby repealed.

Sec. 4. That the certificates provided for in this act and all silver and gold certificates already issued shall be receivable for all taxes and dues to the United States of every description, and shall be a legal tender for the payment of all debts, public and private.

Sec. 5. The owners of bullion deposited for coinage shall have the option to receive coin or its equivalent in the certificate provided for in this act, and such bullion shall be subsequently coined.

The new Canadian Pacific Bridge across the Niagara River has been located directly below the mills at the north end of the Niagara Falls. In the arrangement for the joint use of the bridge, the Lehigh Valley will give the Rome, Watertown and Ogdensburg and the Canadian Pacific terminals in Buffalo, and in return it will have Portland as a link to Suspension Bridge to connect with the Canadian Pacific

A Remarkable Anti-Friction Screw.

The *Electrical World* describes and illustrates a very unique application of the ball-bearing principle, intended to overcome the excessive friction of the screw used for elevators. Our contemporary says:

The principal difficulty with the screw gearing has been an excessive amount of friction of the powerful screws in the necessarily massive nuts. In a recent design for an electric elevator this trouble has been very neatly avoided through the ingenuity of Charles A. Lieb, who devised for this and similar purposes the extraordinary ball-bearing nut which appears in the cut.

As will be at once seen, the arrangement consists in interposing the hardened steel balls so much used in bearings between the open thread of the screw and the thread on the nut, so that instead of constant grinding action between the two, the balls will roll easily around and relieve the surfaces in great measure of friction. A longitudinal by-path from end to end of the nut is provided so that the balls roll freely around the threads, and then back to the starting point. The cut shows in addition to this remarkable anti-friction device the safety

prove a success active operation on a large scale will be immediately commenced."

The Valley Shut-Down.

Consultations are being held almost daily among the officials of the roads, and inquiries of various kinds are being sent to the furnace operators. A few days ago a conference was held at Pittsburgh between the general freight agent of a prominent railroad and two of the largest pig-iron manufacturers in the Mahoning Valley. The conference lasted some time and the situation was thoroughly canvassed. No promises were made as to what action would be taken by the railroads, but it is the impression that a material reduction in freight rates will be made at an early day. The prospects of a further reduction in the price of coke are not so promising, although a further reduction in price is not impossible. That the shut down of the furnaces in the two valleys will have a beneficial effect on the market seems certain, and one furnace operator in the Shenango Valley, whose letter we publish below, states that it is already being felt.

We are in receipt of a number of communications from pig-iron manufacturers

three or four years have made money, and they seem to have good sense enough not to lose it now by paying exorbitant prices for the raw material and high freights to railroads; or, in other words, they do not propose to run at a loss.

Another large manufacturer gives his views of the situation as follows:

I do not think there are any prospects of resuming operations anywhere in the near future. There are a great many questions to be adjusted and a great many interests to be brought into line to enable this section of the country to keep its position in the iron trade, and this cannot be done in a day. The railroad companies have the freight matter under advisement. They have agreed to investigate the matter thoroughly to see whether the situation requires the scaling down of rates as well as all additional costs going into the manufacture of pig iron. I can hardly venture an opinion as to what they may do in the matter, but I think if they make the investigation fairly and in the spirit of trying to meet the necessities of the situation they will be willing to grant us some concession.

Another manufacturer in the Mahoning Valley closed down his furnace for the reason given in his letter, which reads as follows:

We have stopped because we cannot afford to run our furnaces and sell pig iron at present prices and pay for the raw material at present cost. It is our opinion that the railroad companies and the coke operators will see that it is for their benefit to grant us lower prices. We certainly expect it, and will not run until we get them. Our business is more in foundry iron, and our customers report a lighter business than they have had for the last three years, which does not look encouraging.

Another large producer in the Mahoning Valley briefly expresses his views as follows:

There is no change in the condition of things in the Mahoning Valley. All the furnaces here are out except the Thomas Furnace, at Niles, and the two furnaces of Fayette Brown, receiver. I think the railroad people are getting a little uneasy, but no definite understanding has been arrived at. I would scarcely want to venture an opinion as to what the outcome will be. The stoppage has certainly strengthened our position.

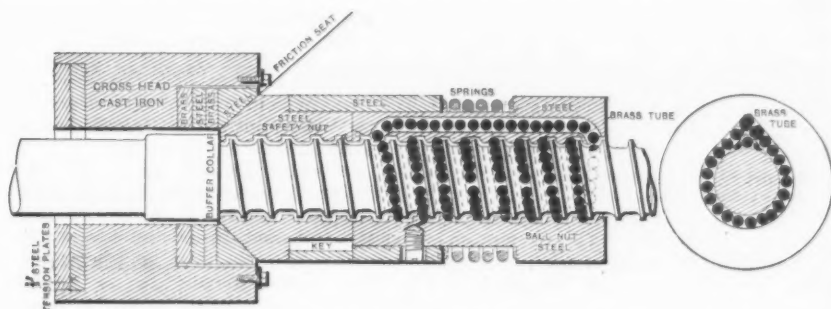
From a large pig-iron manufacturer in the Shenango Valley we received the following:

The shut down has been general in the two valleys, and out of 38 furnaces but seven are in blast, and two of them will go out this month. We think the coke manufacturers and the railroads are willing to make such concessions as will be favorable when the furnaces are ready to start, but think it would not be good policy to go into blast until some of the surplus stock is worked off. Already we are receiving more inquiries for iron, and the outlook is brighter than it was.

The above fully sets forth the present situation of affairs in the Mahoning and Shenango valleys, and from the views expressed in this correspondence it is evident that there will not be a resumption of operations for some time. A favorable reply from the railroads to the requests made by the furnace operators for lower rates may hasten the resumption, but the feeling seems to be prevalent that if the shut down is prolonged it will be of considerable advantage to the pig iron producers.

An item printed in *The Iron Age* of January 1 stated that Eugene H. Cowles had written a letter to the *New York Tribune* suggesting that the metal aluminum be called "alium" for the sake of brevity. We omitted to add that Mr. Cowles did not claim the authorship of the contracted form which he favored, but distinctly stated that it was the coinage of Oberlin Smith, who brought it to notice in his paper, "Aluminum in Search of a Nickname," which was read at the Washington meeting of the American Institute of Mining Engineers.

The annual meeting of the American Society of Civil Engineers is being held in this city.



A REMARKABLE ANTI-FRICTION SCREW.

thread, which ordinarily is not in action, and the bearing devices appropriate to the screw gearing. The practical result of using this ball bearing is to reduce the friction enormously, and consequently increase in a very large degree the efficiency of this particular method of transmitting rotary into rectilinear motion. If a screw fitted with this ball bearing nut is held vertically, the friction is so slight that the nut will run down freely of its own weight, a very remarkable effect when it is considered that the pitch is not steeper than that shown in the cut and the screw several inches in diameter, and with nut of moderate weight. This is one of a series of similar anti-friction devices which have been invented by Mr. Lieb, all of which are characterized by very simple and ingenious application of the ball-bearing principle to every-day use.

The price of local ore in Wisconsin is indicated by the following press dispatch from Black River Falls, in that State: "The Allen Mining Company of this city will deliver 1000 tons of iron ore to the York Iron Company's furnace, taken from their mines six miles east of this city. According to the terms of the agreement the company will pay \$2.90 per ton, delivered at their furnace, on all ore that assays 58 per cent., with not to exceed 20 per cent. silica. Ore that will assay 59 per cent. will bring \$3 per ton; 60 per cent., \$3.10, and so on. It costs \$4.06 a ton for the Gogebic ore delivered at the furnace, but the ore taken from the range assays about 65 per cent. The ore from the Allen mines is a brown hematite. The 1000 tons purchased by the York Iron Company is an experiment, and should it

who have closed down their furnaces, and considerable information relating to the movement and the prospects for resumption is furnished.

One of the best-posted pig-iron manufacturers in the Mahoning Valley, and who was one of the first to suspend operations, writes us as follows:

All the furnaces in the Mahoning Valley are closed down indefinitely, except one at Niles and the two that are operated at Youngstown by Fayette Brown, receiver. The prospects for the resumption of operations are not flattering, because there are large stocks of iron held in the valley by all the furnaces, so that it would be a mistake for the furnaces to resume operations inside of 60 days. I believe that that is generally the feeling of the pig-iron manufacturers in this valley. It is hard to say what the railroads will do, but judging from the numerous daily inquiries they are making, it is fair to presume that they are about to take the matter into consideration. We are satisfied that we made a mistake in not making a greater demand upon them at the meeting held in Pittsburgh last month. Well-informed railroad men, who are in the service of the different railroads coming into this valley, say that \$1 per ton on coke from the Connellsville region into this valley will pay the railroads better than any other class of freight they have. This being true, then I hold that they should do it at this time, as the necessities of the hour demand it. There will be no resumption of operations of the furnaces in this valley until these matters are all satisfactorily adjusted. No person can take good money, go into the market to-day, purchase the raw material and freight it to the furnace, there convert it into pig iron, sell it and get 100 cents on the dollar. This being the case, we have nothing else to do but to wait until there is a reduction on the raw material and the freights on the same and the freights on the manufactured article, or until the price of pig iron advances, and the latter is hardly probable by reason of the large stocks and the anxiety of some furnacemen to sell iron to meet ore payments. The furnaces in this valley for the last

The Uses of Natural Gas.

Prof. Edward Orton of the Geological Survey of Ohio, one of the highest authorities on natural gas, has expressed the following opinions lately:

Natural gas finds its highest and most valuable use as a domestic fuel. It is here that it does the greatest good to the greatest number. In all our dealings with it, this fact should be kept constantly in view. To maintain it for the longest period for this service is our highest interest in relation to it. If there is any use for which gas should be sold below the price of the fuel which it supplants, it is its use in cooking stoves. The less fortunate members of the communities should be the favored ones in this regard. For the gas used in heating there is no occasion to mark the price below the cost of coal; neither is there any justifiable demand for a discount on gas bills increasing according to the number of fires supplied. If a sliding scale is introduced, it might, perhaps, better be made to slide the other way, charging consumption beyond the average at a higher rate.

An advance in price on the part of all municipal corporations for all the uses that they undertake to supply is their proper policy. The price at which they have furnished it hitherto leads to undervaluing and wasting the gas. The supply will do the towns more good by serving them longer, if they are required to pay a higher price for the gas. All gas should be sold by measured volume. Meters and gauges ought to be introduced everywhere. No adequate motive to economy can be brought to bear on many consumers until they are obliged to pay at a proper rate for what they use.

Next to domestic use, the use of gas in the production of steam power is to be counted the most suitable application of it. Comparatively small amounts of it are required for this purpose, and great convenience and economy result therefrom. The most skillful use of it will find a rate of 50 feet to 1 horse-power sufficient, but a use of more than 80 feet to 1 horse-power should not be allowed, even if the user is willing to pay for it.

Of the various manufacturing uses in which the gas is applied as fuel proper, glass making probably has the best rights. It contributes larger returns to the community in the shape of wages than other like industries. While its introduction into northern Ohio has been greatly overdone, and while much of it has been accomplished by the exercise of a mistaken policy, it should be maintained as long as possible. To this end economy should be everywhere enforced. The window-glass works might, perhaps, be required to introduce coal into their furnaces for melting at an early day, reserving gas for the stages of blowing and flattening. From certain uses to which gas is now largely applied it should be at once entirely withdrawn. It is a great wrong to the community to allow it to be used in burning common building brick and in calcining limestone. These processes consume large quantities of gas and make no returns, except to their owners. For these uses wood and coal are good enough.

The industry that consumes gas in by far the largest amount is iron working. It is a grievous mistake on the part of any community or company to allow a rolling mill access to its gas field. An ordinary mill uses as much gas every day as several thousand families would consume, and the returns to the common good by such an application are small compared with any other ways of using the gas. Even though a rolling mill stands ready to pay as much per thousand feet as the small consumers pay, it ought not to be supplied. If it is willing to do this, it shows that there is

not enough charged for the gas. It may be to the interest of the gas company to get their money back rapidly, it is true, but the community has interests, if not rights as well, that should not be overlooked in relation to this supply. The State interferes when an oil well is left without being plugged, or when a gas well is allowed to blow into the air without use. Why? Because these precious stocks of mobile power are fitted to do good to great numbers of the people, and no man has a right to take any action by which they shall be needlessly wasted. A like reason could, perhaps, be found for forbidding entirely the use of gas for the rough work that has been named above.

If economy is everywhere insisted on and practiced the last days of natural gas in Ohio may be its best days. If, on the other hand, the wasteful policy that is now so largely in force should be maintained, there is sure to be, and at no very distant day, great disappointment and reaction in the communities that have obtained it and that have been stimulated by its acquisition to what may prove an unhealthy activity. Natural gas is merely a transient phase of the stored power of the earth. It is folly to talk of its taking anything like a permanent place in the work of the world. The claim that it can do so springs only from enthusiasm or socialism. There is in reality but little of it, and this little is found in but very limited regions and cannot last long whenever its utilization is undertaken by the eager and masterful activities of our day.

Natural gas has a very important work to do. It should prepare the world for something very much better than itself. It is giving an object lesson to great communities as to the advantages of gaseous fuel, and it can hardly be that this lesson will be given in vain. The exemption from the soot and dust inseparable from the burning of bituminous coal in our cities, and the positive addition that gaseous fuel makes to the comfort and convenience of the entire community when used as a domestic fuel and as a source of steam power, are results in themselves too valuable to be abandoned when these small and treacherous stocks of buried power are exhausted. The conversion of the coal now burned in a large city into gas before being used would result in an immense economy in fuel, besides affording the incidental advantages alluded to above, and this economy of stored power is an object to which the civilized world will soon be obliged to address itself in good earnest.

NEW PUBLICATIONS.

THE MECHANIC'S COMPLETE LIBRARY. Compiled by Thomas F. Edison, A.M., and Charles J. Westinghouse; 575 pages; size, 5½ x 4 inches. Published by Laird & Lee.

The full title of this book is "The Mechanic's Complete Library of Modern Rules, Facts, Processes, &c., &c., for Engineers, Mechanics, Electricians, &c.," compiled by the two authorities above named. A sufficient review of this compilation would be the bare statement that the Thomas F. Edison, A.M., whose name appears on the title page, is not the Mr. Edison of electrical fame, nor is the Charles J. Westinghouse the Mr. Westinghouse whose reputation is world-wide in connection with the air brake and other railway appliances. The suggestion of the title page is, however, that it is compiled by two eminent authorities, and is addressed especially to the engineers and electricians. If any doubt exists as to what two authorities did compile this work that doubt will be very quickly dispelled by glancing at the pages within. The whole thing is gathered together in a

hasty and disorderly way. It contains facts of interest and value and fictions of no value at all. There is neither order nor reason in its arrangement, and the sense of proportion as to the worth of departments is quite lost sight of. The first subject treated of is steam engines. Next we are told about cold chisels and belting, and are later brought back to locomotives, are introduced to a little geometry, and finally get the theory of the steam engine. Some tables follow soon after, and then come the weights and other characteristics of iron bars; but the next 100 pages or so take up so many and such unrelated topics that we cannot undertake to enumerate them. On page 386 is shown a cut of an ornamental paper holder that will undoubtedly be of great interest to the electrician, if not to the engineer. Heating and ventilating and steam heating are treated in a perfunctory manner, and then comes the part devoted to electricity. On page 561 we are told that the uselessness of the lightning rod is becoming so generally understood that the agents find their vocation a trying one. Fewer and fewer rods are manufactured each year, "and the day will come when a lightning rod on a house will be regarded in the same light as a horseshoe over a man's door."

On Sulphur in Bessemer Steel.*

BY JOHN W. CABOT, BELLAIRE, OHIO.

In the manufacture by the Bessemer process of soft steel suitable for rolling into fine sheets, tubes, &c., a difficulty is sometimes met with, in the tendency of this kind of metal to rise violently and boil in the molds while being cast; this results in hollow-topped ingots, and consequently in an undue amount of scrap in the subsequent rolling. It has been noticed that this peculiarity does not pertain to all pig irons, some grades producing a blown metal which pours quietly, while others, in whatever way the blow may have been conducted, give a metal which rises in the molds, accompanied by the evolution of large quantities of hydrogen and carbonic oxide gases, and requiring a long time to solidify. This difference in behavior has been somewhat difficult to understand. We were at first inclined to look to the element manganese for the explanation, because of the well-known part which it plays in the reactions between the oxygen of the blast and the other elements, particularly carbon. The higher manganese irons generally gave a characteristic rising metal, but the manganese theory was abandoned when it was found that pig irons of lower manganese content sometimes worked in the same way.

While blowing soft steel at Bellaire from metal taken directly from the blast furnace we made some observations which seemed to offer an explanation of this difference in the behavior of different grades of iron.

As the direct iron has less sulphur than the same iron when remelted in the cupola, owing to the absorption of that element from the coke in the remelting, we were able to produce from it steel very low in sulphur. Now this unusually low-sulphur metal showed the rising tendency in a most marked degree; when, however, the metal from the furnace contained an increased percentage of sulphur, this excessive evolution of gases did not take place, and the casting of the ingots was accomplished in the normal manner.

Some analyses are here given of a number of blows varying in their carbon and

* Read at the New York meeting of the American Institute of Mining Engineers.

manganese content, which were of this character of rising steel; and for comparison, a second series which worked quietly. The rising steel analyzed as follows:

C.	Mn.	S.	Si.
0.08	0.32	0.033	0.009
0.08	0.33	0.034	.....
0.10	0.28	0.033	.....
0.10	0.34	0.035	.....
0.09	0.38	0.031	.....
0.09	0.30	0.035	.....
0.09	0.35	0.028	0.009
0.09	0.40	0.036	.....
0.09	0.40	0.036	.....
0.08	0.30	0.035	.....
0.08	0.40	0.038	.....
0.08	0.25	0.035	.....
0.10	0.44	0.039	.....
0.10	0.40	0.025	.....
0.09	0.38	0.025	.....
0.10	0.41	0.020	.....
0.08	0.35	0.035	.....
0.11	0.48	0.028	.....
0.10	0.45	0.025	.....
0.08	0.35	0.035	.....
0.09	0.38	0.032	.....
0.08	0.35	0.035	.....
0.09	0.38	0.032	.....
0.08	0.35	0.035	.....
0.10	0.44	0.030	.....
0.10	0.42	0.030	.....
0.08	0.20	0.030	.....
0.08	0.34	0.036	.....
0.09	0.37	0.036	.....
0.08	0.33	0.035	.....
0.10	0.42	0.035	.....
0.10	0.44	0.032	.....
0.08	0.22	0.035	.....
0.08	0.40	0.030	.....
0.08	0.33	0.035	.....
0.10	0.41	0.020	.....
0.08	0.35	0.030	.....
0.08	0.33	0.028	.....
0.08	0.33	0.028	.....
0.09	0.28	0.032	.....

The normal working steel is represented by the following:

C.	Mn.	S.	Si.
0.08	0.45	0.069	.....
0.08	0.32	0.057	.....
0.08	0.30	0.049	.....
0.08	0.28	0.048	.....
0.08	0.28	0.084	0.009
0.08	0.33	0.053	.....
0.08	0.25	0.065	.....
0.08	0.38	0.050	.....
0.08	0.35	0.068	.....
0.08	0.27	0.064	.....
0.08	0.35	0.064	0.009
0.08	0.32	0.046	.....
0.08	0.32	0.068	.....
0.10	0.44	0.050	.....
0.09	0.36	0.048	.....
0.08	0.38	0.050	.....
0.08	0.35	0.072	.....
0.08	0.42	0.068	.....
0.09	0.52	0.070	.....
0.08	0.42	0.080	.....
0.08	0.44	0.050	.....
0.10	0.44	0.050	.....
0.09	0.42	0.048	.....
0.11	0.46	0.054	.....
0.09	0.38	0.060	.....
0.08	0.38	0.075	.....
0.09	0.42	0.072	.....
0.08	0.28	0.057	.....
0.08	0.30	0.058	.....
0.09	0.40	0.078	.....
0.08	0.40	0.057	.....
0.08	0.35	0.055	.....
0.08	0.35	0.055	.....
0.08	0.33	0.060	.....
0.08	0.35	0.055	.....
0.09	0.42	0.045	.....
0.08	0.33	0.046	.....
0.09	0.45	0.065	.....
0.09	0.43	0.070	.....
0.09	0.42	0.045	.....

It will be noticed that the only essential difference in the two series is in the amounts of sulphur present. It is unusually low in the rising steel, and of about the amount common in cupola metal in the case of the tests which worked normally, the average analysis being for the rising steel,

C = 0.09. M = 0.36.
Si = 0.009 S = 0.03.

and for the quiet metal,

C, 0.084. Mn, 0.39.
Si, 0.009. S, 0.058.

It is well known that sulphur exerts a potent influence upon the condition in which carbon exists in combination with iron in pig metal. A few hundredths of one per cent. are sufficient to throw a large portion of it into the combined form in

an iron which would otherwise be graphitic. Now, in the case of the heats blown from the high sulphur metal, the sulphur probably acted in the same way in forcing the carbon of the metallic bath into combination (in which condition only is it readily attacked by the oxygen of the blast), the line of separation between complete carbon-oxidation and the beginning of iron-oxidation being thus more sharply defined, and the carbon thoroughly washed out before the iron was attacked. This supposition was borne out by the character of the change in the flame, which was quick and decided.

In order to determine the correctness of this view, we added to the blows of the low sulphur iron enough more sulphur to increase the 0.01 and 0.02 per cent. originally present to 0.05 and 0.06, and in every case the troublesome evolution of gas from the metal was prevented and the steel poured quickly. In whatever way the extra hundredths were added, whether by adding coal or shale to the heats, or by mixing with them a high sulphur pig iron, the effect was the same.

No doubt the peculiarity of low sulphur steel can be overcome by mechanical means, such as stirring or by the method of repouring. The presence, however, of 0.04 or 0.05 per cent. of sulphur seems to have a favorable influence on the reactions taking place between the oxygen of the blast and the elements in the pig metal, in producing this description of material.

The following table, to show the relative quality of coke made at Big Stone Gap, Va., is based upon the analysis of McCreath:

	Average of	Fixed Carbon.	Ash.	Sulphur.
Seven samples Big Stone Gap coke, made in open				
rick and by barrel test...	93.23	5.69	0.749	
Three samples Connellsville, Pa., coke, oven test	88.96	9.74	0.810	
Four samples Chattanooga, Tenn., coke, oven test...	80.51	16.34	1.595	
Four samples Birmingham, Ala., coke, oven test...	87.29	10.54	1.195	
Three samples Pocahontas, Va., coke, oven test...	92.55	5.74	0.597	
Eight samples New River, W. Va., coke, oven test...	92.38	7.21	0.552	
One sample Big Stone Gap coke, oven test, analysis made by A. S. McCreath, September, 1890.....	94.04	4.74	0.588	

A movement is on foot to consolidate the different interests at Big Stone Gap.

Brooklyn is justly proud of its Polytechnic Institute, now being enlarged by the addition of a new structure, which will give it a capacity for at least 1000 students. The new building, work upon which is already far advanced, is constructed of red sandstone and Collaburg brick, and is a substantial and imposing structure. It has a frontage of 120 feet on Livingstone street and a depth of 100 feet. The structure is five stories in height and has a square tower near the center, rising above the steeply-pitched tiled roof of the building, with a pyramidal top and a projecting turret. A massive double arch spans the main entrance at the left of the tower, and clusters of windows diversify the front. For the site and building about \$350,000 will be expended, but a rich return is expected from the enlarged work to be accomplished.

A reorganization among the officials of the Philadelphia Natural Gas Company of Pittsburgh has recently taken place. The newly-elected officers of the company are as follows: George Westinghouse, Jr., president; A. M. Byers, vice-president; George H. Browne, general manager; W. D. Uptegraff, secretary; John Caldwell, treasurer; E. S. Pearson, assistant treasurer; Allen Marthens, auditor; Matthew Bigger, contracting agent, and A. Cummins, land agent.

The Washburn-Moen Company's Western Move.

Several months ago, when the Washburn-Moen Mfg. Company purchased a tract of 60 acres in South Chicago, just south of the Calumet Iron and Steel Company's property, it was supposed the company had finally decided upon locating at this point and erecting the plant thereon. Time passed, and as nothing transpired, it was presumed the idea had been abandoned and that the company would, possibly, not locate in South Chicago. This possibility remains, as a tract of acres in Waukegan, Ill., was purchased last week for the company. It has now been definitely settled that a plant will be erected either in South Chicago, on the 60 acres formerly purchased, or at Waukegan. It is said by those in a position to know that Waukegan will be given the preference over South Chicago, for reasons to be given more in detail below.

The land purchased at Waukegan comprises between 200 and 300 acres, of which 120 will be for the use of the Washburn-Moen Company. The property is located just south of the city limits of Waukegan, between the high ground on which the town is built and the lake. H. B. Cragin, who is the company's agent in Chicago, said to a reporter: "We have purchased the land. How much there is of it I do not know. Probably twice as much as we obtained in South Chicago, or 120 acres. We will locate our plant either at South Chicago or Waukegan. We have not yet decided at which of these two points. It is a settled fact that we will locate a plant at one or the other of them. We will carefully consider the advantages offered by each and then decide. I cannot say whether other interests will accompany or follow us."

Waukegan is 35 miles from Chicago's court house and 7 miles from the Wisconsin State line. It is incorporated as a city, and has gas and electric light. Its water supply, from artesian wells, is perhaps the best and purest in the State. It is located on high land, separated from the lake by a plain. It has now a harbor of refuge, with a Government pier. It could readily be made a port practicable for the needs of commerce by dredging what is known as the "dead" river and connecting it with the lake. In fact, the natural harbor, as it stands, is as good as that at the mouth of the Little Calumet River, near Tolleston, and the Swift, Armour and Morris lands. It is on the Chicago and Northwestern road, and will soon be reached by what is generally known as the Chicago and Evanston line, now being constructed. It is understood that the Rock Island road will run a branch line to Waukegan. The agency of all others that will in greatest degree help Waukegan as a manufacturing center is the Elgin, Joliet and Southeastern Railroad, known as the "Outer Belt" line. The road will do for Waukegan what the Western Indiana Belt Line is doing for the Calumet region, Lyons and Cicero. It is primarily a transfer road. Starting from Waukegan, it swings around Chicago, connecting with the 30 odd roads entering this city, and meeting the Baltimore and Ohio at a point east of Griffith, Lake County, Ind. From this point to the new stock yards site is but a few miles, and the necessary connection can easily be made if it is desirable.

Elizabeth, N. J., is experiencing quite a boom just now in the manufacturing industries. Three large concerns, the Worthington Hydraulic Pump Works of South Brooklyn, the Ball Engine Works of Erie, Pa., and the Progress Iron Works of New York, are to locate there this spring, and will give employment to about 1300 hands.

Electrical Sheet-Metal Former.

The accompanying drawings show two machines in which electricity is utilized in the forming or shaping of sheet metal. The machines are the invention of Mark W. Dewey, and are controlled by the Dewey Corporation of Syracuse, N. Y. The apparatus shown in Fig. 1 is applicable to the forming of metal objects from sheets when heat is required to soften the metal, and particularly when successive and graduated pressings are necessary. In such cases, when ordinary presses are used, the metal becomes hardened after each pressure, and requires removal for successive heatings and annealings. In many classes of work the entire operation can be completed without removing the sheet of metal or the blank from the press till the article is finished.

The method is here shown as applied to a hand press for making cartridge cases, but it is obviously equally applicable to machine presses. The frame A contains the stamping devices, and is bolted to a table or bench. The strip of sheet metal B is placed between the punch C and the drawing die D. E is a stationary annular cutting punch encircling the drawing punch C, from which it is insulated by the insulation *a a*. One of the terminals F of the heating circuit is connected to this cutting punch, while the other is connected to the punch C through the upper part of the frame, which is insulated from the lower part by the insulation *b b*. G is the screw operating the punch C, and H is the screw that raises the drawing die D, with its annular cutting die I, to cut a disk from the sheet and to make electrical contact between the center of the disk and the punch C and the circumferential portion of the disk and the cutting punch E. Electrical contact is made as soon as the cutting punch and die press the metal on opposite sides. The metal is then rapidly heated and softened by the current passing through it.

When the metal is heated sufficiently the dies D and I are raised still more to cut the disk from the strip or sheet, and clamp the same to hold the metal smooth between E and I D. Then the screw G is used to rapidly force the punch C downward, so that the metal disk is pressed into the die D and made to receive a corresponding form or cup shape. As the sheet or disk is thus forced into the die, its circumferential portions are drawn out from under the clamp, and the strain or tension thus exerted upon the metal effectually insures smoothness in the completed article, and also enables a deeper cup to be produced at a single operation. The current may be interrupted if desired during the latter part of the operation, or may not be applied until after the case is partly formed, as the metal may be pressed to a certain extent before it is necessary to heat it, but the operation is so rapid that it is preferably heated at the commencement of the operation.

In forming cartridge cases a blank shown at 1 is first cut, and, while electrically heated, this disk is drawn into a cup, shown at 2, somewhat longer than the finished case, to allow for the formation of the head. The case is then trimmed, as usual, to remove its rough edge formed by pressing. Then the case is placed in a suitable countersunk die, *k*, so that the closed end is held projected sufficiently, and the die containing the case is passed in the heading press, shown in the lower drawing, beneath the heading punch *p*, which descends by means of the handle *j* to flatten the closed end of the tube or case into the countersink. The surplus length of metal in the case is thus taken up in the formation of the head, as shown at 3 and 4.

The machine shown in Fig. 2 is an application of this principle to the spinning

of metal articles. A is a sheet of thin metal mounted upon the lathe B, and held by pressure from a headstock, *a*, against a mold, C, of the required form, fixed on the face plate *a'* of the spindle. The disk is heated by passing an electric current through it from a point near its center to the point where the tool D is in contact with it.

Figs. 3 and 4 represent an ordinary screw stamping press in two positions. Two molds or dies are employed in this apparatus at a time. The hollow mold C' is placed on the bed or base *f*, and upon it is laid a blank of sheet metal, A, or a pile of blanks when several are to be stamped at once. The under side of the blank or sheet A rests upon the flat upper

clamps H and H' serve as holders for the sheet A and may be located on all sides of the dies, if desired. The clamps may be faced with non-electric conducting material where they come in contact with the sheet, or the ears *e*, supporting said clamps, may be insulated from the plunger by insulation, *e'*, to prevent short circuiting of the current through the plunger. The base *f* of the press is insulated from the terminals by insulation *i i* to prevent the current short circuiting through the base.

Suit has been entered in the United States Circuit Court at Pittsburgh by the Cowles Electric Smelting and Aluminum

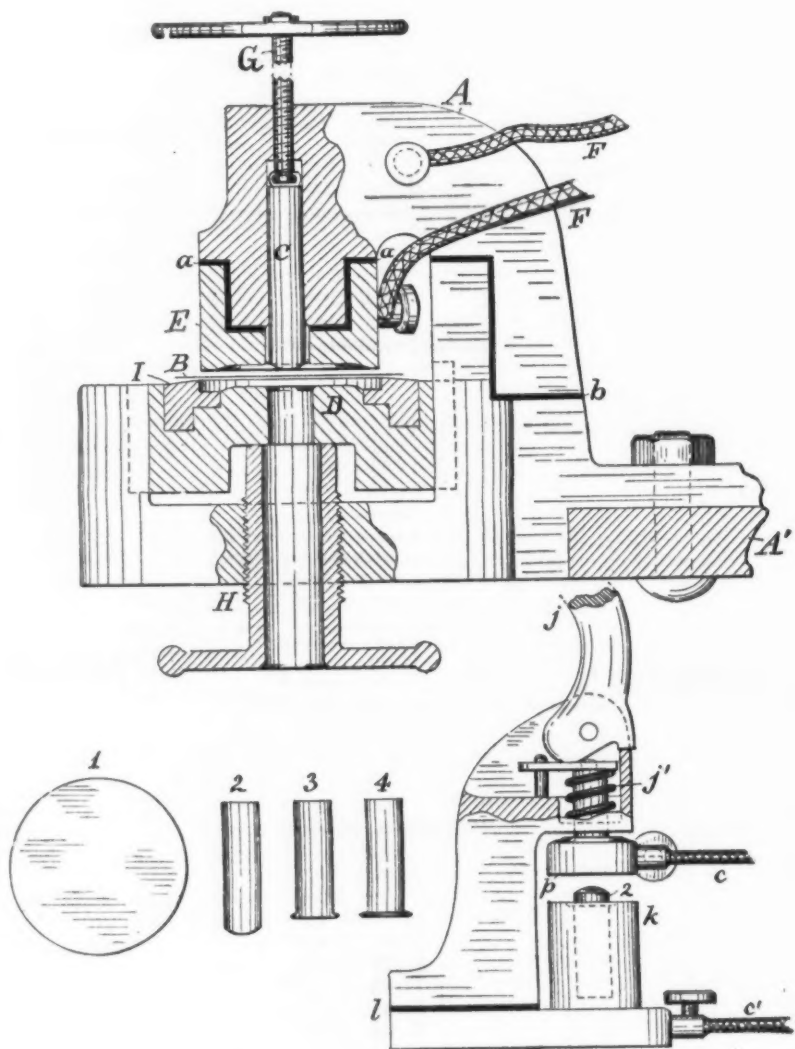


Fig. 1.—Forming Cartridge Cases from Electrically Heated Blanks.

ELECTRICAL SHEET-METAL FORMER.

surface of the hollow die. When the upper die or mold C descends (which die fits quite closely into the lower hollow die or mold when at its lower position), yielding clamps H and H', carried upon the follower or plunger to which the upper die is secured, descend with it and firmly press the sheet A at points on each side of the dies against electric terminals, I and I', connected to the conductors *b* and *b'*, to make good electric contact between the same and the sheet. The electric current is thus permitted to flow through the sheet A between the terminals, the sheet becomes heated and softened or annealed and is expanded into the hollow die, stretching out into a smooth seamless pan or other article without buckling or corrugating. These yielding

Company of New York against the Pittsburgh Reduction Company. It is charged that the latter company are infringing on four different patents, including improvements in electric processes of smelting ore for producing alloys, bronzes and metallic compounds and improvements on furnace.

Preparations for an electrical and industrial exhibition, to be held at Worcester, Mass., are being made rapidly. A circular letter has been sent to every prominent manufacturer of electrical machinery in the Eastern States. Power will be furnished by the Worcester Electric Power Company. Among other novelties it is proposed to have a bicycle propelled by electricity. An elevated track will be built

for the exhibition of street cars and wagons, and provision will be made for the running of an electric boat.

Contraction as a Quality Measure.

BY P. KREUZPOINTNER.

It is not at all a matter of indifference whether or not consumer and producer harmonize in their views on the intrinsic

irrefutable, as far as our present knowledge of the properties of material goes.

No one will be rash enough to assert that contraction as a quality measure in every-day testing fulfills these essential conditions. For many years it has been the bone of contention, until contraction has lost ground. Four years ago the architects and engineers of Switzerland declared in a body against contraction as unreliable and deceptive. It has been eliminated from the new German speci-

will very much increase the accuracy of the measurement if screw-gage gauges with round bearing surfaces are used. As at present obtained the fractured area is a very indefinite quality, few experimenters obtaining it in the same way. At the Cambria Iron Works the mean of the three thicknesses was taken as the mean thickness, the error being

$$\frac{t_1 - 2t_2 + t_3}{6}$$

or one-third the mean hollow of the section. At none could the pieces be measured as fitted together, one part only being measured, thus giving additional high results for final area." This is certainly not very inspiring. Aside from this difficulty of measuring contraction accurately, we have the speed of testing machine as an uncertain element to take into consideration.

Unwin, in his "The Testing of Materials of Construction," page 90, says, "Generally, the more slowly the load is applied the shorter is the local contraction and the less the contraction of area."

The above author further says, page 84: "It is now common, in testing iron and steel by tension, to record the ultimate elongation in a length of 8 or 10 inches, and the contraction of area at fracture. Both the ultimate elongation and contraction are supposed to indicate the ductility of the material, and a good deal of confusion arises from the discrepancy between the two quantities."

Weyrauch, in his "Qualities, Strength and Methods for the Calculation of Iron and Steel Structures," page 54, says: "It must be admitted that contraction is very much influenced through local inequalities, so much so that its exclusive consideration as a quality measure, besides a strength test, may become as unfavorable to the producer as it may become undesirable to leave contraction entirely out of consideration."

In Ledebur's "Handbook of Metallurgy," page 668, Vol. III, we find the following opinion of the author on the much discussed question of the merits of contraction: "Engineers are by no means agreed whether elongation or contraction is preferable as a measure of ductility. With very good reason the fact is presented that contraction, much more than elongation, depends on chances, and is therefore less reliable. While the changes in elongation take place quite regularly in proportion to the changes of strength, the same cannot be said of contraction, which does not exhibit a similar regularity."

German thoroughness and conservatism in regard to established principle is proverbial, and we are therefore justified in expecting that German engineers should pay considerable attention to reduction of area as a quality measure if it were really a useful and reliable factor in determining quality. Such, however, is not the case. Aside from the fact already mentioned that contraction was recently thrown out of Government specifications for railroad material, we find that in the specifications issued by the Union of German Architects and Engineers in 1886, for the ordering and inspecting of iron and steel structures for bridges and buildings, no mention at all is made of contraction. Elongation is recognized as a measure of ductility.

For several years efforts have been made in Europe to bring about uniform methods of testing and inspecting of railroad and building materials. Meetings have been held at Dresden in 1884, Munich 1886, and Berlin 1890, at which 120 delegates represented their various countries. Among these delegates the highest authorities on technical metallurgy, properties of metals and testing of the same were present, like Bach, Bauschinger, Bebelubsky of St. Petersburg, Brauns, Goedicke, Hartig,

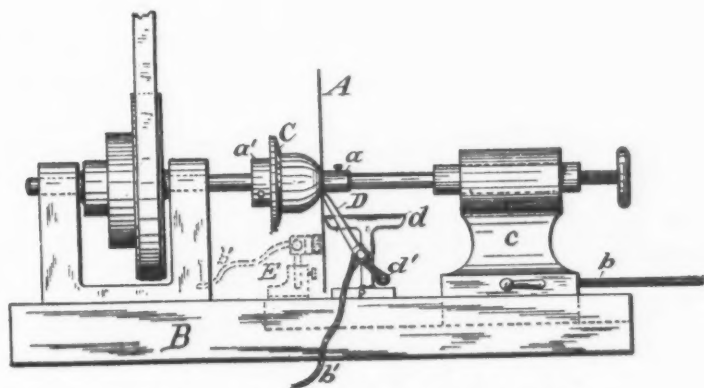


Fig. 2.—Spinning Electrically Heated Metal.

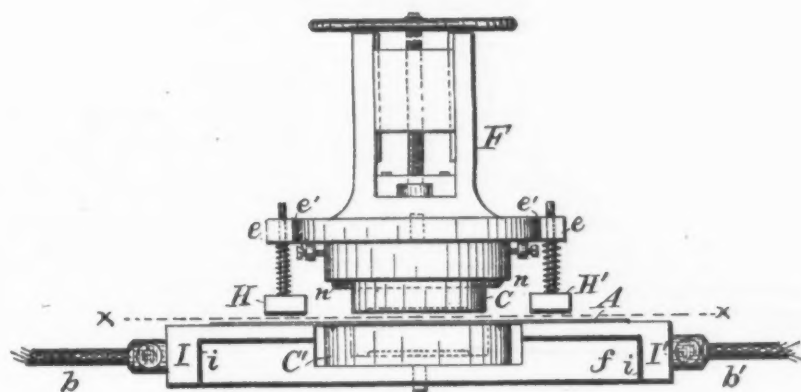


Fig. 3.—Press for Shaping Electrically Heated Metal.

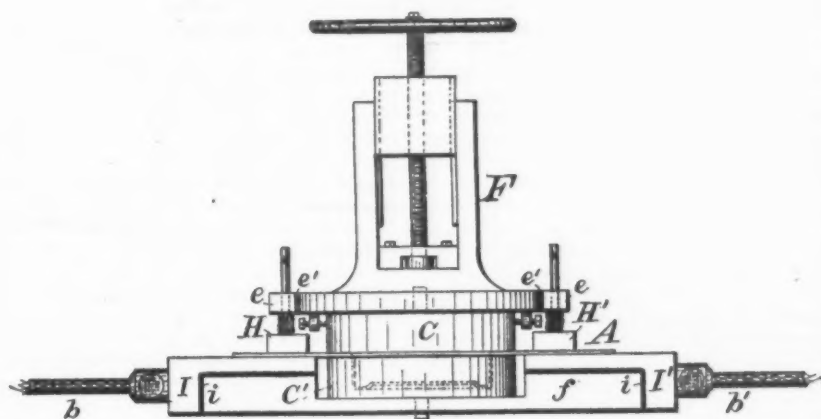


Fig. 4.—Press for Shaping Electrically Heated Metal.

ELECTRICAL SHEET-METAL FORMER.

value of the measures adopted by the former to ascertain the quality or qualities of the material furnished by the latter. If the engineer provides a specification he relieves the producer of the responsibility of finding out the causes which eventually tend to destroy the material furnished. In order to attain the best results of a system of testing one of the essential points is to have specifications based on principles which leave as little room for doubt and dispute as possible and are accepted by all concerned as sound and

cations, though Woehler, the father of contraction in Germany, and certainly one of the highest authorities in Europe on testing of material, was a member of the commission which deliberated six years over the new specifications. Even the advocates of contraction admit that it is difficult to measure and liable to cause errors. In the United States Government report on "Mild Steel for the Cruisers Dolphin, Atlanta, Boston and Chicago," page 140, we find the following: "On account of the curvature of the section it

Jenny, Ritter von Kerpely, Kick, Martens, Tetmajer.

The results of the deliberations of the conferences were embodied in a set of resolutions and published by the standing committee, of which Bauschinger is chair man.

Coming from such a high source, it is very interesting to know how contraction has fared in the opinion of these authorities.

In regard to tensile tests, we find the following in the resolutions of the conferences:

L. TENSILE TEST MEASUREMENTS.

1. The following measurements are recommended:

- (a) Tensile strength.
- (b) Contraction.
- (c) Elongation after fracture.
- (d) Elastic limit.

"Contraction of area at the point of fracture depends a great deal on the size and shape of test section. For this reason a uniform test section is desirable. Whenever possible the various phenomena occurring during test should be represented by diagrams. The diagrams shall include the point of fracture." "Only the work done by the test piece before beginning of contraction is of any practical value, after that only the contracting portion chiefly performs the remaining work to be done. This portion of the work, however, is very small, so much so that the extension of the useful diagram to the point of fracture introduces but a small error. For this reason, and because the determination of the point of maximum strength is somewhat difficult, it is advisable to include in the result of test the work done after maximum strength is reached. Besides, it may be desirable sometimes to see whether there is any relation between contraction and elongation in the period between the point of maximum strength and the point of fracture." *

Here we have the opinion and public declaration of 120 expert physicists, some of them of world-wide reputation, that contraction is of no practical value, that what is valuable in a test is the work done before contraction begins. If the work done during the period of contraction is at all taken into consideration it is not on account of any real value of it—on the contrary, there is a small error introduced—but because it is more convenient. Contraction is, therefore, not a quality measure proper, but only a desirable feature which may be taken into consideration for convenience sake, and because no harm is done by doing so. The soundness of the above conclusions in regard to the want of real value of contraction as a quality measure is confirmed by the researches made at the Royal Test Department at Berlin, Prussia. B. Sürsch, assistant director, in his "Contributions to the Study of the Flow of Metals," published in "Mittheilungen," 1889, says: "When a test piece breaks without contraction, whether with or without the forming of a 'cup,' and provided there were no such defects in the material which would naturally prevent or augment contraction, then the material possessed the highest degree of uniformity in regard to flow." In other words, the more uniform a material the less local contraction that material ought to show theoretically. As every engineer and metallurgist admits that, other things being equal, that material is the best which is the most uniform, then the deduction to be drawn from the results of the above researches is that local contraction is not a sign of good, but of inferior quality, hence, as the conference rightly decided, of no practical value

Engineer P. Zetzsche, chief of the test department of the steel works, Sulebahi, Prussia, says* that in all his experience contraction follows no law, like elongation; on the contrary, it is merely the exponent of local conditions. He gives the results of tests as a confirmation of what he says. From a large number of tests made with Russian, Swedish, English and German tire steel he comes to the conclusion that contraction furnishes no guide to indicate the condition of the material, and he adds that it is the grossest self deception to draw conclusions as to the quality of tons of steel from the results of one test of a small test piece, when it is known how small a defect may alter one way or another the percentage of contraction.

Chief Engineer Zetzsche also calls attention to the important part phosphorus plays on contraction. He says: "A small percentage of phosphorus favors greater contraction without lowering the tensile strength under the usual slow pulling strain sufficiently to cause the rejection of the material. In the following table (he gives the results of 45 tests and chemical analyses) one cannot help noticing the remarkable regularity with which phosphorus and contraction go together. I have found that tires with high phosphorus did not stand the drop test. But I have also found that such tires high in phosphorus which did not stand a drop test gave very good tensile tests and particularly good contraction, the latter sometimes as high as 50 per cent. This, however, is simply a confirmation of the statement of Gruner and Deshayes that phosphorus lowers the ability of steel to resist shock, but lets it appear favorably under a slow tensile test."

Brauns was a member of the Government commission to work up the new German specifications, made very extensive experiments to establish the value of work on steel by reducing ingots to various diameters under the steam hammer, and then testing the steel so treated. The results of his experiments were published.† In regard to contraction he came to the following conclusions: "While the influence of work (on iron and steel) is clearly perceptible on the law which determines elongation, no such influence is perceptible in regard to contraction. The results, as given in Tables I and III, clearly permit only one of two conclusions—either there is no relation between contraction and the quality of a material, or contraction depends on conditions which are removed or so obscured from our observation that its meaning is lost to us. In both cases the value of contraction as a quality measure is a rather doubtful one."

After dwelling on Professor Bauschinger's researches and objections to contraction, Mr. Brauns continues: "Just as well as the steelmaker knows the influence on contraction of small local defects, he knows, too, by what means the evil influence of these defects can be reduced to a minimum in order to meet the specified contraction. Every steelmaker knows the influence of a certain percentage of silicon on the homogeneity of the steel, and by this means it is actually possible to meet the rigid Woehler's specification (tensile strength, in kilograms, and contraction added together must give 100). But to what extent such material is able to resist shocks and blows is another question and one which has led incautious steelmakers into very embarrassing situations. Bauschinger's researches have also proved that elongation is much less dependent on chances than contraction is."

Professor Bauschinger made 894 tests with various railroad materials and his conclusions are summed up as follows: "The

percentage of contraction depends very much on local defects; such defects, while thus lowering the measure of quality in a small test section, are not detrimental to the whole object, as an axle or tire. That it is extremely difficult, in every-day mill practice, to produce a metal entirely free from such small defects, as has been shown."

Professor Akerman, whose authority in this matter no one can question, in speaking of Woehler's formula of adding strength and contraction, says: "It certainly looks scientifically, but it is not science." Professor Tetmajer of Zurich, Switzerland, also a high authority, is of the same opinion. He agrees with Kirkaldy and Woehler that contraction measures the ductility of a metal at the point of fracture. But he asks what practical value such a measure has to the engineer, who cares to know only what a metal can stand within the limit of maximum strength? "We also agree with Woehler," he says, "that only at the point of fracture all the work is done which the metal is able to perform. But it is just on account of this merely local character that we have been convinced for years of the advisability of leaving the work performed by a test piece after the maximum strength has been reached, entirely out of consideration.*

"Contraction, as well as elongation, at the point of rupture, are of no practical value to the engineer. Engineers Jenny and Hartig agree with me on this.

"We are of the opinion that contraction is a measure of ductility at the point of fracture, but only at that point; as a measure of quality for the whole material it could serve only when we had a material so uniform and homogen, so free from all defects as we can never get in practice, but only on paper. The least irregularity and want of uniformity means a softer spot, and therefore greater contraction somewhere in the metal, hence its entirely local importance."

Summarizing the opinions of the authorities cited above, we find the opinion to prevail that while it is interesting and in some cases perhaps desirable to pay attention to contraction, it is not a valuable nor a liable measure of a specified quality of iron and steel, because it is an exponent of local conditions rather than of the uniformity of a metal.

A measure of quality, which as is stated in the Government report cited above, cannot be determined by two different persons alike, and under favorable conditions even is liable to introduce errors, certainly does not deserve to be considered of scientific value. To the merely local character of contraction the writer can testify most emphatically. Only very recently he came across three samples of the kind—one axle and two of plate steel. The axle steel showed 44 per cent., one of the plate steels 50 per cent. (so called marine plate, to be used under Government supervision), and the other plate steel 40 per cent. contraction. The advocate of contraction would no doubt have considered all three good steels, since strength and elongation were also fair. Yet every steelmaker who cared for his reputation would deny that either one of these steels was good metal.

However we may look at this question, everything points to the conclusion that contraction is valuable to the expert physicist, being one of the many phenomena which help him to better understand the properties of materials. But as a measure of quality, forming part of specifications for commercial testing, contraction is a delusion and a snare, and a hindrance to progress in physical metallurgy. The theory of contraction is a tradition which, at the present day of making steel

* "Resolutions of Conferences for the Establishment of Uniform Methods of Testing," page 18. Munich, 1887.

* *Stahl und Eisen*, 1885, No. 7, page 347.

† *Stahl und Eisen*, 1883, No. 1, page 6.

* "Mittheilungen der Anstalt zur Prüfung von Baumaterialien," page 18, Zurich, 1886.

in immense quantities, in different varieties and by various methods, is out of date and place in a modern, progressive engineering office, and should be treated with consideration only in the laboratory by the physical expert.

THE WEEK.

The Hebrew Technical Institute of this city, a valuable institution, has twice the number of applicants for admission that can be taken in.

The labor laws of Massachusetts have been collected and issued in pamphlet form by Mr. Horace G. Wadlin, Chief of the Bureau of Statistics of the State. Mr. Wadlin says that the labor legislation of Massachusetts exceeds in volume that of any other State, and that it is beginning to serve as a model for similar legislation elsewhere.

Among shipments to Mozambique for the Portuguese expedition are velocipedes, intended to be used on the trails through the forests and across the plains made by hordes of Africans, who have traveled these paths in single file for hundreds of years.

Oregon, Washington and other States are taking measures to raise by taxation from \$100,000 to \$240,000 each, to be used in the exhibition of products at the World's Fair.

Reciprocity with Canada is a live question in Mexico. Canada is probably willing to have it understood that the United States, if expeditious, might be allowed to get in ahead.

Parties in Dallas, Texas, have contracted with the Mexican Government for the improvement of the harbor of Coatzoalcos, Bay of Campeachy. They are to build jetties and secure 24 feet of water, receiving therefor \$2,000,000. All materials and tools from the United States to be admitted free of duty.

Recent reports were that a syndicate has been formed in Brazil with a capital of \$20,000,000 to control the market for Para rubber, and advancing prices indicate that they have gotten to work.

Governor Toole of Montana, says that in assessable wealth that State is growing faster than any other in the Union. The increase last year was nearly \$34,000,000.

Louis Sterne, civil engineer of London, in an argument before the rapid transit commission in this city, favored an underground electric road on the Greathead system, now running between London Bridge and Binfield road. For \$1,000,000 per mile he offered to bore two tubular tunnels 40 to 60 feet below the surface and line them with steel. This included all charges for rock cutting. Mr. Sterne said his firm could finish the work in a year by opening shafts at ten points, causing no interruption of traffic by brick cartage, steel plates being the lining used.

The prolific wheat crop of Washington and Idaho, together with a moderate quantity from Oregon, is flowing eastward through various channels of transportation, and as the aggregate is estimated at nearly 20,000,000 bushels. The movement is important. About 580,000 bushels have been received since September 1, in Minneapolis. Nearly as much is believed to have gone to Duluth, destined to New York, and another outflow is in the direction of Kansas City and Texas. The freight to Minneapolis by either the Northern Pacific or the Union Pacific is 30 cents a bushel, and it is now selling at 80 cents, leaving it to net 50 cents at the shipping point there.

The engineer's report to the Chicago drainage commissioners, signed by William E. Worthen and John Newton, the latter consulting engineer, has been made public, and condemnation proceedings will begin at once. What is known as the Ogden Ditch route was chosen, and the total cost of 18 feet water and rubble side walls is estimated at \$25,700,000; the width to be 180 feet. Most of the excavation and transfer of material must be done by machinery.

The project of Baron Hirsch to establish a colony of 500,000 Russian Jews in the Argentine Republic is being vigorously pushed, so it is reported.

California rejoices in timely rains just at the season of plowing.

A concerted effort now making in the cotton States to establish direct steamship connection with Europe is the outcome of a convention held in Atlanta a year ago with this object. A report submitted at that time showed that many difficulties must be overcome. There is no trouble in getting outward freights during the cotton season, five months in the year, but for the other seven months business must be uncertain. Another obstacle is the small volume of imports. The times are now believed to be more propitious, as Florida and Texas invite immigrants, giving a more promising outlook in that direction. Moreover, direct trade in cotton is already established from Rome, Macon, Atlanta and other interior cities. Last week the convention re-assembled to perfect an organization, which is understood to contemplate the creation of two corporations, each with \$1,000,000 capital. Brunswick, Ga., is named as one of the termini for the proposed lines.

From the careful records kept at the St. Mary's Falls Canal, it appears that the average price per ton per mile received by vessels in the carrying trade of Lake Superior was, in 1889, 0.15 cent.; the total amount moved was 7,516,022 tons, and it was carried an average distance of 790.4 miles. The average rate on all railways in the United States in the same year was 0.976 cent., or more than six times as much. Wheat has been carried from Chicago to Buffalo for 1 cent per bushel, or 0.04 cent per ton per mile, and thousands of tons of coal have been carried from Buffalo to Duluth at 25 cents per ton, or 0.025 cent per ton per mile.

Minnesota is now the chief white pine State in the Union, and the center of white pine operations for the next decade will have passed from Michigan and Wisconsin to the North Star State. This appears from a census of the lumber industry in the three States named. The United States is probably the largest owner, counting the Red Lake reservation pine. This Red Lake tract is the largest white pine forest in the United States, according to census showing.

The shutting down of the celluloid works at Adams, Mass., indicates that the entire business will soon be concentrated at the works in Newark, N. J.

Information which has been collected in regard to the products of the new State of Washington and the general progress for 1890 shows an advance over any previous year. The population has increased to 349,516, as reported by the June census, an increase of 274,400 since 1880. The compilations show that there have been produced 38,000 bales of hops, worth \$2,000,000; wheat, oats and barley to the amount of 29,000,000 bushels, worth \$11,000,000; 1,722,643 tons of coal, worth \$6,890,612, and there has been packed at the mouth of the Columbia, along the Washington Coast, Puget Sound and Alaska 1,761,000 cases

of salmon, worth probably \$6,000,000, besides \$300,000 in halibut, sea bass and herring. The lumber product of Washington is about 1,500,000,000 feet. The total exports of various products via Port Townsend amount to \$4,077,767, and the imports \$927,726. The Washington catch of skins and furs amounts to about \$400,000. Lime has been manufactured to the amount of about 1,000,000 barrels, worth \$1,157,186. There have been built at the shipyards of Puget Sound 42 vessels of various kinds amounting to 5791.67 tons gross and 5200.13 net. Steps have been taken toward developing the large iron mines. The most important movement was that made by Gen. R. A. Alger and local capitalists to establish large iron works at Kirkland, a suburb of Seattle, in which large beds of Bessemer ore at Snoqualmie Pass, 50 miles distant, would be worked. A small furnace at Port Townsend turned out iron worth about \$500,000 for armor plates for the war vessels now being made at San Francisco. There are also large live-stock interests.

Twenty-three boilers for the new cruiser Texas were in the shops of the Richmond Locomotive Works, which were partially destroyed by fire last week. The extent of the damage is not known.

Eight mills that are said to control 85 per cent. of the oatmeal output have formed a consolidation at Chicago, by which a new company will absorb all the individual mills, virtually forming a trust.

The American Bobbin, Spool and Shuttle Company were organized at Portland, Maine, and comprise 85 per cent. of all the bobbin and shuttle interests of the United States.

The assessed taxable wealth of Missouri has increased \$304,000,000, or 54 per cent., in the last 10 years.

The natural gas supply in Indiana holds out well. Full reports as to present condition and prospects are of a favorable tenor. At Muncie, Anderson, Marion and other leading gas towns no perceptible diminution of pressure is reported. There is an abundance of gas for domestic, manufacturing and illuminating purposes. Many wells have failed, but wells sunk in close proximity to them are yielding freely. The average life of a well which is drawn upon for its full flow is only about three years. After that time wells are likely to choke up with oil or water, although some of the first wells which were sunk in Indiana are still flowing as freely as ever. The situation in the cities and towns outside of the gas fields to which gas is piped is not so favorable. All of them report a declining pressure, and in only one or two of these places are the companies able to supply gas to manufacturers except during the summer, when the domestic demand is very light.

The blockade of several ports in Chili by Government war ships in the hands of revolutionists paralyzes the nitrate trade and other foreign traffic. The object is to cut off the public revenues.

Eastern capitalists are locating the dam for an immense reservoir on the Santa Ana River, New Mexico, which will irrigate millions of acres now arid.

Secretary Blaine explains that the United States have never been formally invited by the Imperial Government to participate in Jamaica's exhibition.

It is only recently that the Eastern mills have entered into the manufacture of goods from Egyptian cotton, which is duty free. The reason assigned is that the manufacture of coarse and cheaper goods is moving rapidly to the South, and it is claimed by the agents that Egyptian cotton is a superior article to the home product.

The Iron Age

New York, Thursday, January 22, 1891.

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CHAS. KIRCHHOFF - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

REMOVAL.

The publishing and the editorial offices of *The Iron Age* have been removed from 66 and 68 Duane street to more commodious quarters at 96-102 READE STREET, between Church street and West Broadway.

The Steel-Rail Trade.

Affairs among the steel-rail makers are approaching an important point. We say "approaching" advisedly, because matters are far from having reached the stage which the newspapers have described, and over which free-trade journals, like the *New York Times*, are lashing themselves into unnecessary fury. The two Scranton mills have taken the first steps toward a consolidation, which may or may not lead to a successful issue, but which will probably end in substituting one strong concern for two sharp rivals. Until the details are all settled, which they are not as yet, little more can be done toward the combination which is regarded by so many as a settled matter. The plan favorably considered at the meeting of the mills in this city last week is practically identical with that alluded to in *The Iron Age* when dealing with the subject lately. As we explained then, it closely resembles the arrangement which at one time was to bring happiness to the cut-nail mills of the Ohio Valley. Each concern is given a certain percentage. All are at liberty to sell as much as they like and at any price they may deem satisfactory. At the end of each month the aggregate of the sales is redistributed according to the fixed percentages. Those who have exceeded their percentage pay a penalty per ton for the excess, the only material change in the plan last agreed upon provisionally, from the one formerly discussed relating to the amount of this penalty. Every manufacturer, therefore, takes his chances that he may sell too much, and thus become liable to heavy payments, which are distributed among the more cautious rivals.

Such in its broad features is the plan favorably considered, but it is not yet adopted. We understand that there is no agreement to date among the individual concerns of one group, to whom a large percentage has been allotted *en bloc*. It is probable, however, that conflicting interests will be harmonized, and that the arrangement will be effected as soon as it is finally settled that the two Scranton mills are consolidated.

The report of the association shows that the shipments of steel rails in 1890 were 1,388,186 gross tons of standard-section rails. To this must be added the product of the former Allegheny Bessemer Company, probably about 87,000 tons, carrying the total to 1,475,000. Of this quantity the Western mills, including in them the Cambria, made 911,000 tons, while the four Eastern mills produced 564,000 tons. The latter took relatively little Western business, the sales of the different mills being confined more than usual to their own territory. The figures, therefore, reflect quite well how the business fell off in the Central and Northwest and in the Southwest, the bulk of the Southern trade being taken by the Eastern mills. Considering the new mileage of 1890, the total product is quite satisfactory, but it cannot be denied that the outlook for the present year thus far is very unsatisfactory. If the combination is formed it will tide over a period during which, without it, light production would be coupled with ruinously low prices. The mills will do very well indeed if they can average \$30 for their output for 1891. That is certainly not a figure which will in the least degree check consumption.

The West is Prosperous.

Fears were entertained in November and December that the then stringency in the money market might spread disaster throughout the entire country. So many business men were known to have extended their dealings beyond prudent limits, taking the chances on continued ease in financial matters, that hardly any surprise would have been expressed if failures had been very frequent. It was so difficult to get even high-class paper discounted in December that the remark was on nearly every one's tongue, "Nobody can be blamed for failing now." When the financial stringency was first felt in the seaboard cities the merchants of the interior regarded it with somewhat careless interest. The West was believed to have grown so rich and become so nearly self-sustaining since the last great financial disturbances that its business interests were felt to be secure from a shock originating wholly from foreign causes. Western business men were in fact inclined to boast at first of their freedom from any financial depression whatever. But when their own banks felt the pressure for ready money, and discounts were refused on the very best paper current, the prospect of a financial panic in the West as well as in the East became alarming.

The month of December was certainly sufficiently gloomy for Western business men to satisfy any prophet of woe, particularly in those sections in which much money had been tied up in real-estate speculations. The one encouraging feature of the situation was the excellence of the collections from the smaller class of tradesmen dealing directly with the people. They seemed to have, if anything,

more cash than usual, and to pay their debts more promptly. This was a convincing argument that the condition of the country was sound, and that as soon as confidence was restored in financial centers it would be found that a thoroughly solid basis existed for hopes of a good year in 1891. In the midst of an exciting chase for needed money, however, a business man is absorbed in the demands of the present, and lets the future take care of itself. For a time—brief, but still too long for such an experience—grave apprehensions were felt in the West as well as in the East, and the fancied security of position seemed but a fancy. January 1 was welcomed as a day of relief, because interest and dividends would then be paid on numerous securities and the money market might be easier.

The critical time has now passed, and the West is rapidly recovering from its scare. Wherever one goes he sees signs of prosperity. New projects, which it was feared might be temporarily set aside, are being pushed ahead in the old-time assurance that the funds will be provided as they are needed. Plans are being made for conducting business on a larger scale than ever in many branches of trade. Building projects are numerous in small as well as in the large cities. Merchants report their trade continuing without a break, the old year running into the new with unusual smoothness. In numerous instances merchants and manufacturers are again discounting their own bills. Low prices for staple goods have induced the placing of unprecedented orders by all classes of merchants, who are certainly shrewd enough to make no serious error as to how they shall dispose of their stocks thus acquired. Improvements, additions and alterations are being made to factories as though there never was such a thing as a financial panic and it would be impossible for trade to decrease. The vigor of the West was never more plainly seen than now. The weak spots are almost wholly confined to iron-manufacturing localities. There business will be found relatively quiet, and it may continue so for some little time, but it must revive ere long if the generally good business in other branches of trade in the West is not suddenly checked. The time seems to have passed for that, and the next panic is not due for at least a year or two.

That the general adoption of the "cold-saw" method of cutting metals will depend wholly and primarily upon the character of the machine introduced for doing the work is a foregone conclusion. That this method, which in reality employs a thin milling cutter of comparatively large diameter, is well adapted to meet every requirement satisfactorily is beyond dispute. The introduction of the machine and its displacement of the rapidly-revolving saw now used will depend upon two things—the method of mounting and of driving the saw. The controlling factors are identical with those governing the construction of the ordinary milling machine,

of which this is only a modification. Rigidity is the first and most important requirement. There must be sufficient strength to prevent absolutely any yielding, since the smallest degree of elasticity would be fatal to good results. The driving gear should be correspondingly powerful. These qualities obtained, the adoption of the cold saw will follow speedily. The machine of this description possesses great advantages when compared with the machine now employed. This is particularly apparent in the character of the work done by both. The old machine can only be used on rough work; the cold saw can be used for fitting where great accuracy is demanded, as in bridge and ship building establishments especially, and it is here that its vast superiority is most manifest. In addition, it requires less power to be operated, the wear and tear item is much reduced, and these points, together with the greater accuracy mentioned, more than counterbalance its slower cutting speed. These tools are used somewhat extensively in England, and their adoption here depends, as mentioned, solely upon good design and construction.

Shall Pooling be Legalized?

The Western Traffic Association has made little progress during the past week in perfecting its plans, on account of the indifference, if not the downright hostility, of a number of prominent railroad managers whose co-operation is essential to success. In some quarters there is a suspicion of good faith, the whole scheme being pronounced a stock-jobbing operation, undertaken with the object of unloading securities acquired during the recent financial flurry. Others fail to see how the weaker roads are to derive any advantage which they do not already possess. Moreover, it is intimated that a majority of the commissioners are allied to special interests and cannot be depended upon to adjust impartially the percentages and division of rates. The Chicago and Alton and other corporations that held aloof still maintain their position of independence, at the same time declaring that they are as much in favor of maintaining rates and reducing expenses as any roads now in the combination. Chairman Stickney, of the Chicago, St. Paul and Kansas City, says: "What is needed is a radical change in the practice of making rates. Rates are now made in an arbitrary manner and without regard to mathematical principles. No calculations are made on the cost of transportation or what profits the roads will derive from the rates. The rate makers simply jot down a lot of figures, hap-hazard, and take it for granted that, on the whole, they will come out ahead." This practice of rate making, Mr. Stickney says, must be stopped and rates be based upon scientific and mathematical principles before the condition of the railroads can be improved. From the present outlook the prospects of the new combine, to say the least, are dubious. It is possible that the proposed modifications of the Interstate Commerce law, now under dis-

cussion at Washington, may relieve the situation. Having organized an association on the pooling principle, it is all-important, in the view of the persons concerned, that pooling should be legalized. But this may be a delusive hope. In the present temper of the Western grangers, who in many sections are exasperated by alleged railroad extortions and are making their power felt, Congress may hesitate to relax any existing restraints. Perhaps it is just on this point that the recalcitrant railroad officials are fearful of impaling themselves. A wholesome dread of the possible consequences deters them from entering the coalition.

Lake Superior Ore Profits.

A Duluth paper announced recently that the profits of the Chandler iron ore mine on the business of 1890 would be over \$600,000. As the mine shipped some 330,000 tons of ore, this would indicate a profit of almost \$2 per ton. It seems a pity to spoil a story so well calculated to boom the development of more ore properties, but the officers of the Chandler Iron Company deny the truth of the statement, and say they will be well satisfied with the year's business if the profits only prove to be half as much. The truth is that the rosy anticipations indulged in by iron ore miners at the opening of last year's business were sadly blighted. They would have had a year of unexampled prosperity and of extraordinary profit if business had continued as it began. But the presence of nearly 4,000,000 tons of ore on the docks at Lake Erie ports at the close of navigation showed a condition of stagnation which boded ill to miners' profits. It is claimed that all of this ore has been sold, but there is so large a bulk of it, more than 50 per cent. above the stock of any previous season, that it is safe to presume much of it will still be on the docks when navigation opens. The furnace companies will not move it, as they do not need it. The pig-iron trade will hardly become sufficiently active between this and spring to absorb much more than half of it. Meanwhile the ore companies will have more or less difficulty in enforcing their contracts. It is likely that much longer terms for payment will have to be made with the furnace companies disposed to stand by their agreements. But there must be many furnace companies not in a position to take the ore coming to them. In that case the ore will have to be sold, and at a much lower price than the original contract named. The mining company will be the heaviest loser.

It is safe to say that so far no Lake Superior ore company supplying the general market can estimate the profit on last year's business. The contracts yet to be settled are in many cases so important that wealthy companies are passing their usual dividends to see what the outcome will be. They may need their spare cash to tide them over the coming season. A general policy of retrenchment and reduc-

tion of output is being put into effect, which will considerably restrict shipments next season. The huge stock piles at mines, which were a feature of the opening of navigation last year, will be quite scarce this year. Some large shippers say they are prepared to put out just half of what they did in 1890. They do not propose to be caught again with a large stock at lower lake ports at the close of navigation. In fact, there is some danger that the past year's experience of Lake Superior ore miners may cause them to go to the other extreme, and that the ore supply may run short before the summer is ended.

Heavier Steel-Rail Sections.

The increasing size of steel rails used by steam roads is having an effect on the tonnage which should not be overlooked by those who are considering the annual consumption of iron and steel. It is estimated by Robert W. Hunt, who will be recognized as good authority on the subject, that in recent years there has been an annual increase of 12½ per cent. in the average weight of the sections used. At no previous time has the adoption of heavy sections been so general as now. Even new roads in the Southwest, which would but a few years since been laid with 56's, are calling for 70's, recognizing the fact that they must arrange for an interchange of traffic with other roads using freight cars of modern proportions. Older roads which have been using 67's and 70's now call for 80's and 85's. The result of this general movement toward heavier rails is the increased tonnage of output by the steel-rail mills. Those who figure on a considerably reduced tonnage this year, because the mills are likely to stand idle for a part of it, are reckoning without a full knowledge of all the facts. If the mills were to run for the same time they did last year and turn out the same number of rails, it follows from what has just been said that the tonnage would be 12½ per cent. greater, thus involving a consumption of that much more pig iron, ore, coke, &c. A reduction in the running time of the mills could be made this year, it will be seen, and still permit the tonnage of the aggregate output to reach that of last year. This was forcibly shown in 1888, when the steel-rail mills, though practically idle for half the year, turned out almost two-thirds of the tonnage of 1887, which was a year of high pressure from the beginning almost to the end.

Another point, more strictly technical in its bearings, is the necessity for heavier machinery which the use of heavier rails involves. In order to put the same amount of work into the metal the section of the ingots must be greater. This calls for more powerful machinery, which modern mills have generally adopted, but which some of the older mills do not possess.

Professor Bickmore estimates the annual consumption of railroad ties in the United States at 85,000,000. The average life of a tie is six years.

MANUFACTURING.

Iron and Steel.

The blast furnace at Martin's Ferry, Ohio, owned and operated by the Benwood Iron Company of Wheeling, W. Va., has been banked down for an indefinite period, owing to the depressed condition of the iron trade. A few months ago the capacity of this furnace was considerably increased.

Among the new enterprises to be established at Covington, Va., is a nail mill and a muck-bar mill.

The incorporators of the Shenandoah Iron and Brass Works, recently incorporated at Charleston, W. Va., are C. A. Stevens of New York, Edward Ault of Booneville, N. J., and F. W. Brown and others.

The United States Rolling Company at Aniston, Ala., who recently went into the hands of a receiver, have settled with their large force of hands up to December 1. The last payment was made a few days ago and consisted of \$13,000. The men are returning to work, and it will not be long before this immense plant will be in active operation again. The company are reorganizing every department.

The next legislature of Alabama will be asked to incorporate the Southern Steel Company of Birmingham, Ala., with W. A. Walker, T. T. Hillman and G. L. Morris as incorporators.

The Secretary of War has agreed to have a test made of the steel produced by the basic process at Chattanooga, Tenn., for the purpose of ascertaining its fitness for heavy ordnance, the law giving Secretary Proctor power to make such tests, and they will be conducted by the Chief of Ordnance.

The Old Dominion Iron and Nail Works Company, at Richmond, Va., will shortly put in a new gas plant for heating nail plates. They will add another water wheel to increase the power for driving trains of rolls and will install an electric-light plant.

The Shelby Rolling Mill, at Shelby, Ala., has shut down on account of the scarcity of coal, but the company announce their intention of resuming operations when the miners' strike is entirely over.

Work on the new factory of the South Wareham (Mass.) Nail Works is being pushed rapidly forward. New machines are to be put in.

Everett Furnace, of Joseph E. Thropp, at Everett, Pa., is in operation working up stock, preparatory to closing down for an indefinite period. Operations will not be resumed until there is a decided improvement in the pig-iron market.

James Hooven, owner of the Norristown Iron Works, at Norristown, Pa., comprising a rolling mill, pipe mill and blast furnace, has just transferred the management of the two mills to his son, having decided to withdraw from active business pursuits. The furnace is now leased by Isaac McHose & Sons. Mr. Hooven will be 83 years old in March. He has been actively engaged in business in Norristown since 1830.

During the year 1890 the plant of the Laughlin and Junction Steel Company, located at Mingo Junction, Ohio, turned out over 85,000 tons of Bessemer steel.

The Columbia and Liberty charcoal furnaces, in Shenandoah County, Va., have both been torn down, and a new stack is being built on the site of Liberty Furnace. The new furnace will be operated by the Liberty Iron Company, of whom H. H. Yard is treasurer, with an office in the Drexel Building, Philadelphia.

Articles of incorporation of the Iowa Iron and Brass Works have been filed at Des Moines, Iowa. The capital stock authorized is \$15,000.

The Gloucester Iron Works, at Gloucester, N. J., which recently shut down, have received a large contract and gone into operation again.

An application has been made to the court for the appointment of a receiver for the firm of McLanahan, Smith & Co., who operate the Juniata Rolling Mills, at Hollidaysburg, Pa.

At a meeting of the stockholders of the North Carolina Steel and Iron Company, at Greensboro, N. C., the directors were authorized to proceed with the erection of a 120-ton coke iron blast furnace at that point.

At the annual meeting and election of the Warwick Iron Company of Pottstown, Pa., recently held, the old Board of Directors were chosen, as follows: Isaac Fegely, Vincent P. McCully, Charles G. Burlinger, Peter Schem, Louis Bergdoll, Jacob Rech and Philip Doerr, Jr. The board subsequently organized by electing Isaac Fegely president, V. P. McCully secretary and Jacob Fegely treasurer.

The stockholders of the Mexican Iron Mountain Company have authorized the sale of their property at Durango, Mexico, consisting of a plant in active operation and 43,000 acres of land.

The Donaghmore Furnace, owned and operated by the Cornwall Iron Company, Cornwall, Pa., has blown out, and it is understood will remain idle for some time. The Donaghmore had been in constant blast for five years.

With the exception of the blast furnaces, the entire plant of the Oxford, N. J., Iron and Nail Company is shut down.

The Jenifer Iron Company, at Jenifer, Ala., have shut down their works for the purpose of making repairs. The plant will be idle about three weeks, and some extensive alterations and improvements will be made.

Machinery.

One of the cylinders for the inclined triple-expansion engines now being built by the Cleveland Shipbuilding Company was successfully cast a few days ago. It measures 76 inches inside diameter by 72 inches, and with the steam chest and flange the casting weighs 11 tons. This is the largest marine-engine cylinder ever cast in the above city.

Johnson & Co., Manchester, Va., are reported to be building a new iron works plant.

The John B. Morris Foundry Company of Cincinnati, Ohio, have invited their friends to be present at the opening of their new foundry.

The E. P. Allis Company of Milwaukee are crowded with work and still receiving fresh orders for large engines. During the past year they built no less than 16 large blowing engines, in addition to a number of pumping engines of great capacity. They are now finishing one of their largest triple-expansion engines for the Omaha Water Works. During the past year they remodeled their main machine shop, replacing the old structure with a substantial brick building and equipping it with a number of lathes, planers, drills, &c., specially adapted to the heavy work turned out in this shop. They have here installed a Shaw electric traveling crane which has a carrying capacity of 25 tons. This is a remarkably efficient machine, with a much simpler system of gearing than traveling cranes are usually supplied with. The machine is capable of three motions simultaneously and appears to be perfectly under the control of the operator.

Locke Brothers of Salem, Mass., have just issued a pamphlet describing their pressure regulators, steam heating regulators, reducing valves, check valves, disk valves, steam traps, &c.

The Roney mechanical stoker and smokeless furnace is fully illustrated in a handsome catalogue issued by Westinghouse, Church, Kerr & Co. of 17 Cortlandt street, New York. This stoker is a simple apparatus which, when attached to steam boilers, receives the fuel in bulk and afterward, without further handling, feeds it continuously to the furnace. The combustible portion is burned, while the ash and cinder are deposited in the ash pit ready for removal.

The Clawson Slot Machine Company have filed articles of incorporation in New Jersey. The capital stock is \$75,000, and the incorporators are Clement C. Clawson, Henry F. Clawson and Edward B. Fulper.

It is reported that F. H. Ball of the Ball Engine Works of Erie, Pa., has pooled his interests with a number of prominent New York capitalists, and that they will erect a large plant at Elizabeth, N. J., for the manufacture of heavy engines. The company, it is said, will have a capital of \$500,000.

The R. W. Ralston Foundry Company of Montreal, Canada, lost \$20,000 recently by fire.

Plans are being perfected for the new buildings of the Stedman Foundry and Machine Company, to be erected at Helena, Mont. The main building, as planned, will be 200 feet long, with a wing of the same length; the blacksmith shop will be 60 x 80 feet, and the tool shop 80 x 40 feet. An iron shed, 400 feet in length, will also be erected. Houses will be built by the company for occupancy by their employees, and the works will be amply provided with railroad facilities. Ground has been broken, and it is expected that the entire plant will be completed and in running order by next August.

The Whittier Elevator Company of 306 Eleventh avenue, New York, have just issued a new catalogue which fully describes and illustrates the various styles of elevators built by them. They call special attention to the novel principle introduced in their new upright hydraulic engine, by which the whole weight of the cylinder and moving sheaves assist in lifting the car; to their direct con-

nected steel wedge safety stop, which is operated by the counterbalance of their car, and to their new automatic stop valves, which cut off all water and power gradually yet completely at the upper or lower floor, while still permitting a stop to be made in the opposite direction at full speed.

The machinery is being put into the new buildings of the Oil City (Pa.) Boiler Works, and it is expected to have the new works ready for operation the first of next month.

The Watt Mining Car-Wheel Company of Barnesville, Ohio, will the coming spring erect a new plant for their foundry and machine works. The buildings will be of iron, and will materially increase the capacity of the company.

The works of the Schimpf & Keim Boiler Mfg. Company, near Morristown, Pa., were burned on the 11th inst., only the heavier machinery being saved from the flames. The loss is \$5000, insured.

The Tyler Tube and Pipe Works, at Washington, Pa., have started up again, and are now expected to remain in constant operation.

The Standard Iron Works, of Superior, Wis., are making extensive preparation for the enlargement of the foundry and capacity of their shops at Tower Bay ship. The addition to the foundry, work on which has already begun, will be 75 x 50 feet, of brick and stone, with an iron roof, and strictly fire-proof. A new cupola and a brick chimney 60 feet in height will be built, and considerable new and improved machinery added.

Catalogue E of the Lincoln Iron Works, of Rutland, Vt., illustrates their long line of machinery for working and handling stone and marble, and which includes the Merriman improved screw gang, with single and double pitman, screw ripper, stone-planing machine, sand-feeding devices, stone-joining machines, horse-power and steam hoisting machines, and the many smaller appliances which form part of the complete quarrying plant.

A novel catalogue is issued by Wyman & Gordon of Worcester, Mass. It shows the many forms which can be made by drop forging. These run from the simple and small handle up to intricate shapes.

An elaborate catalogue is issued by E. P. Allis Company of Milwaukee, Wis., describing the machines built by them. A comprehensive idea of the capacity of this establishment and of the vast variety of work turned out is conveyed by the first illustration in the book. On this page are reduced pictures of the most important machines made—viz., triple expansion pumping engine, air pump, hoisting engine, reversing engine, rolling-mill engine, vertical engine, air compressor, log band saw, steam stamp, Reynolds' Corliss engine, feed pumps and flour mill machinery in general. The next illustration is an admirable view of the interior of the erecting shop in the engine department.

Steam shovels and excavators are fully described in a pamphlet issued by the Osgood Dredge Company of Albany, N. Y. On one page we notice that the firm are impressed with the adaptability of the electric motor for excavating machinery. They urge that it is particularly useful, since power can be transmitted great distances easily and economically, thereby permitting the use of excavators and dredges in many places where the cost for fuel has heretofore prevented their employment. They say that they have already tested this question, and have obtained favorable results.

The Morris Machine Works of Baldwinsville, N. Y., who are an old firm, established in 1864, issue very complete catalogues covering their engines and boilers, centrifugal pumping machinery, pulleys, shafting, hangers, boxes, &c.

The Morgan Mfg. Company of St. Paul, Minn., make all kinds of machinery for contractors and quarrymen. Among the machines they make are horse and steam power hoisting machinery, derricks, rock drills, hoisting buckets, pumps and the various accessories which belong to these machines.

Stationary, marine, locomotive and portable engine "pop" safety valves, provided with Richardson's adjustable screw ring and also water relief, cylinder relief and sniffling valves, are described in a late catalogue issued by the Consolidated Safety Valve Company of 111 Liberty street, New York.

Combination, universal, independent and drill chucks in all their great variety form the subject of a catalogue issued by the Union Mfg. Company of 103 Chambers street, New York.

A revised illustrated catalogue of all the goods made by the Ashcroft Mfg. Company of 110 Liberty street, New York, together with price-list, has just been issued. We find illustrations and descriptions of alarm and low-

water detectors, pressure and vacuum gauges of all kinds, indicators and a general line of steam fitters' appliances.

Thomas Deegan, late of the firm of James P. Witherow & Co., now general manager of the Stirling Company, has established the general office of the company in the Pullman Building, Chicago. The Stirling Company are manufacturers of water-tube boilers of a new design. The tubes are placed vertically or at a sharp incline instead of horizontally or nearly so, which is the usual custom. The Stirling boiler is meeting with a very favorable reception in the West and a great deal of work is now under negotiation.

Some time ago the Midgley Wire Belt Company of Beaver Falls, Pa., received an order from the Government for a trial sample of the Midgley torpedo netting for naval defence. On the 10th inst. the firm shipped a sample piece of 250 square feet to Newport, R. I. The order was received from the Ordnance and Navy Department, and a test of the piece will be made in a few days.

Boys, Porter & Co., pump manufacturers, of Connellsville, Pa., report plenty of orders on hand, and are operating their plant day and night. At present they have under construction a pair of large mine pumps for the coke plant of the Stewart Iron Company, Limited, with a daily capacity of 2,000,000 gallons. They have also recently booked orders for large mine pumps for the Derry Coal Company of Latrobe, Pa., and the Juniata Coke Company of Dawson, Pa., with 1,000,000 gallons daily capacity for each, and one for the Cresson Coal Company of Cresson, Pa., with 1,500,000 gallons daily capacity. In addition to these they have orders for a large number of smaller pumps for various duties. They are about completing large additional shops, which will double their present capacity.

There is a possibility that the Phoenix Iron Works of W. H. Thompson, now located at Cleveland, Ohio, will be moved to Youngstown, Ohio. Considerable correspondence has already passed between Mr. Thompson and some Youngstown parties looking to the removal of the works, but as yet nothing definite has been agreed upon. In all probability the matter will be decided within the next 60 days. The product of the plant consists of a general line of steam engines and cranes, the latter being a specialty of the concern.

The orders received by the Westinghouse Machine Company of Pittsburgh during the year 1890 for their Junior, Standard and Compound engines amounted to over 900 engines, aggregating over 50,000 horse power. For the month of December, 1890, the sales amounted to 47 engines, with an aggregate horse-power of 3350. Among the orders for compound engines received during December, 1890, were the following, principally of large sizes: 200 horse-power for Cincinnati; 250 horse-power for Allegheny; 200 horse-power for St. Louis; two 200 horse-power for Newark; 150 horse-power for Gifford, Ark.; two 250 horse-power for Detroit; 100 horse-power for New York; 100 horse-power for Galveston; 80 horse-power for Media; two 65 horse-power for Bryn Mawr, Pa.; 50 horse-power for Wilmerding; 50 horse-power for Santa Fé, New Mexico; 50 horse-power for Pawtucket, R. I.; two 50 horse-power for Baltimore; two 50 horse-power and one 35 horse-power for Australia. Among the principal orders for Standards received during December, 1890, were the following: 250 horse-power for Michigan City, Ind.; 100 horse-power for West Groton, Mass.; 45 horse-power for Potsdam, N. Y.; 45 horse-power for Germany. Among the principal orders for Juniors received during December, 1890, were the following: 75 horse-power for New Cumberland, W. Va.; two 50 horse-power for Walls Station, Pa.; 50 horse-power for West Philadelphia, Pa.; 50 horse-power for Manchester, N. H.

B. H. Cramp & Co., Philadelphia, brass founders and sole manufacturers of American manganese bronze, state that their output last year was 783,000 pounds, including 200 tons of manganese bronze propeller wheels, of which they make a specialty. Their wheels are in use on the Transatlantic steamships and on all the new war vessels of the United States Navy excepting the Petrel, as well as on many other steamers. Two blades recently finished for the steamship Normand, repairing at Cramp's Ship Yards, Philadelphia, weighed 2 tons each. The firm state that they make castings up to 10 tons in weight.

The Hoopes & Townsend Company, bolts and nuts, Philadelphia, Pa., and Wilmington, Del., have purchased the property on Buttonwood street lately occupied by the Moore & White Company. This property fronts 40 feet on Buttonwood street and extends back to Hamilton street. This addition gives the company a frontage of 512 feet on Buttonwood street, but they are still cramped for room.

Alfred Box & Co., Philadelphia, have just shipped 14 of their radial drills to the Union Bridge Company of Athens, Pa. Including this order, they have sold 42 drills to the above-mentioned company within the past two years.

A corporation to be known as the Haywood Foundry Company has been organized at Portland, Maine. The company have a capital stock of \$150,000. Their officers are: President, Earl A. Thissel of Florence, Mass.; treasurer, H. Warner of Florence, Mass.

Watson Ely & Son of Holyoke, Mass., will not be able to occupy the foundry building recently purchased by the Dean Steam Pump Company for at least a month.

The Colyer Machine Company expect to occupy their new building on North Main street, Pawtucket, R. I., the latter part of this month.

Articles of incorporation have been granted to the B. F. Nichols Belting Company of Holyoke, Mass.; capital \$40,000; B. F. Nichols, president and treasurer.

The Richmond Locomotive Works, Richmond, Va., which were recently reported as contemplating important improvements during the present year, have had quite a set back in a recent disastrous fire. The boiler shop of this establishment was destroyed, but the main buildings, the machine shops, the pattern shop, and all the other buildings, and the most valuable machinery of the works are safe. The burned building was partly of brick and partly of wood, roofed with corrugated iron, and was about 800 feet long by about 65 feet wide. It was known as the south wing of the works, and ran parallel with the machine shop and the pattern shop, and like them, joined the main or front building at right angles. The wooden and corrugated portion of the building was a recent addition, and it was here the fire started. The principal machinery damaged was the hydraulic riveting machinery, one hydraulic flanger and one steam flanger. The work in the shop finished and unfinished consisted, in addition to locomotive boilers, of the furnaces of the United States ship Texas, some 20 in number, as far as constructed. The plant as a whole is valued at more than \$1,000,000. On this there is a blanket insurance of \$585,000; on the Texas machinery there was \$285,000 in insurance. It is stated that the damage to this machinery will be very slight, and will be principally to the bars and polished rod work. The Government requires each installment to be heavily insured as soon as it passes inspection. The company will suffer in no manner whatever on the contract, as a special provision is made in the agreement for delays from fire. The machinery in the building was very valuable and complete, over \$50,000 worth of it having been put in expressly to execute the Government work. The greatest loss will probably arise from the damage to the plates made to be used on the Texas. The estimated damage on the building, machinery and works is placed at \$100,000. There were 25 men employed in the boiler shop. The building will be rebuilt at once.

Plans for the car works building at Beaumont, Texas, are completed and work will begin at once. Several of the departments will front on the main road, the total frontage to be 490 feet, and 100 feet distant and running parallel to them will be the machine and wood-working shops, each 150 x 70 feet in size. The paint shop will be 170 x 70 feet, the erecting shop will be 170 x 70 feet and the blacksmith shop will be 75 x 70 feet, and the iron foundry will be 75 x 70 feet. One hundred feet distant between two rows of buildings will be located the engine and boiler house, which is to be built of brick. These car works will have a capacity of 25 cars daily.

The Maxton Mfg. Company, recently reported as incorporated at Maxton, N. C., for the purpose of establishing an iron foundry and manufacturing machinery, have perfected a final organization by the election of the following officers: John C. McCaskill, president; J. C. Farish, vice-president, with the following as directors: John B. McLaurin, M. McNail, T. B. Pace, T. J. Elenore. The company have a paid capital stock of \$50,000. A portion of the machinery has been purchased and work on the buildings is progressing.

On January 28 the machine shops of H. M. Smith & Co., in the City of Richmond, Va., will be sold at public auction by Thomas C. Bain, trustee and special commissioner. This plant consists of machine shops and foundry.

The Chesapeake and Ohio Railroad proposes making extensive improvements of its machine shops and round house at Clifton Forge, Va. These new improvements, together with the new machinery to be added, will cost about \$100,000.

The R. F. Divver Machine Works, Anderson, S. C., are being enlarged.

The Cleveland Twist Drill Company of Cleveland, Ohio, have purchased a piece of land

100 x 331 feet in dimensions, opposite their present site in that city, on which, it is stated, they will enlarge their plant.

The Herrick Mfg. Company have been incorporated at Syracuse, N. Y., by George S. Herrick and associates, with a capital stock of \$25,000, for the purpose of manufacturing feed regulators for pumps connected with boilers, and other appurtenances connected with steam pumps.

Barbour, Stockwell & Co. of Cambridge, Mass., manufacturers of street-railway supplies, have in course of erection a machine shop, three stories in height and 150 x 52 feet in size, a foundry 175 x 75 feet, having a monitor roof, and a pattern shop 125 x 52 feet. The different departments will be equipped with the most improved machinery, and the old works of the company abandoned.

E. M. Cross of Berlin, N. H., is building a foundry in connection with his machine shop.

Armstrong Brothers, boiler makers of Springfield, Ohio, who recently assigned with liabilities of \$40,000, and assets variously estimated from \$100,000 to \$150,000, will probably resume in a short time. The firm was carrying a large amount of orders, and it is quite likely that some arrangements will be made so that these contracts can be carried out.

The boiler shop, and the machine shop of the Roberts Iron Works Company, Cambridgeport, Mass., were destroyed by fire recently, ruining a large portion of the stock, just inventoried at \$32,000.

Hardware.

Reliance Wire Works Company, Milwaukee, Wis., advise us that their business at present is largely taking the direction of architectural wire and iron work, elevator inclosures, bank railings, wire lath, &c., while they are also paying attention to the manufacture of wire cloth. On this class of work they are building up a large trade.

The Brooks Axe and Edge Tool Works, at Brooksville, Vt., will probably be reopened in the spring by a new company, having a capital of \$50,000.

The Samson Cordage Works, Boston, Mass., are putting in new braiders, which they expect will be running in time to supply the spring trade. This increase in their capacity was made necessary by the large demand for their goods. The manufacturers express themselves as much pleased with the reception extended by the trade to their products the past season.

A new manufacturing company, to be known as the Austin, Soule & Bennett Company, was organized in Milwaukee last week. It is to engage extensively, at Layton Park, in the manufacture of all kinds of tacks and small wire nails, and will succeed to the business of Austin & Soule, greatly enlarging the plant, putting in new machinery, &c. The officers are: Charles Bleyer of St. Louis, president; G. F. Soule, Milwaukee, vice-president; E. P. Bennett of Chicago, secretary and general manager. The capital stock of the new company is \$25,000.

Wm. Schollhorn & Co., New Haven, Conn., report that they are continually increasing their business, adding new styles of scissors and shears and enlarging their facilities. They call attention to the quality, style and finish of their fine scissors and shears. They also manufacture hardware specialties.

The Standard Tool Company, Cleveland, Ohio, state that they have largely increased their facilities for manufacturing by the addition of new buildings, and that their business is remarkably good. They are constantly adding to their line of manufactured tools.

Arcade File Works, Sing Sing, N. Y., are contemplating the removal of their factory to a point more central to their trade, with the view of enlarging their works to double their present capacity. They are at present employing about 150 hands. They have received good offers to locate at different points, but as yet have not arrived at a final decision.

Stover Mfg. Company, Freeport, Ill., report the sale of the hardware specialties manufactured by them largely in excess of the previous season, and the prospect as bright for their general line of builders' hardware. The New Idea spring hinge, made by this company, is meeting with satisfactory sales both in this country and in foreign markets.

C. J. Shaffer, Laporte, Ind., advises us that he is doing a satisfactory business in Perfect carpet stretchers, which extends over the entire United States and also to Australia.

At the recent annual meeting of the stockholders of the National Screw and Tack Company, Cleveland, the following gentlemen were elected a Board of Directors: A. B. Foster, D. Auld, Jr.; T. M. Irvine, H. M. Brainard, T. F. Biedler, D. Elliott, F. L. Gegelein, Mr. Townsend and W. D. B. Alexander.

At a subsequent meeting of the Board of Directors the following officers were re-elected: President, A. B. Foster; vice-president, T. M. Irvine; treasurer, D. Auld, Jr.; secretary, W. D. B. Alexander; superintendent, D. Elliott.

The Murray & Porter Level Company of Pittsburgh, Kan., are behind their orders on the new pendulum level, a description of which was given in these columns two or three months ago.

Miscellaneous.

The Georgia Rolling Stock Company, recently reported as being incorporated at Macon, are to have a capital stock of \$100,000.

An appeal has been made to the Supreme Court of the United States at Raleigh, N. C., in the case of Baltzer & Taacks of New York, which was recently decided adversely to the plaintiffs by the North Carolina Supreme Court. In this suit the New York firm sues the State for \$140,000 for iron furnished in 1868-70 to what was then the Chatham Railway Company.

The Iron Railing Works of Edward Rasch & Brother, at Florence, Ala., are to be increased in capacity.

The Georgia Manganese and Mining Company have been organized at Cedartown, Ga., by J. M. and J. H. Couper, G. M. Taylor and others, who have a capital stock of \$10,000.

The Patterson Iron Property near Jacksonville, Ala., has been purchased and will be developed by the Augusta Mining and Development Company.

The Berlin Iron Bridge Company of East Berlin, Conn., have just completed the roof over the new casting shop of the Montgomery Iron Company, at Port Kennedy, Pa.

The Mount Vernon Car Mfg. Company, located at Mount Vernon, Ill., were organized last April, and operations commenced in September, turning out 10 cars per day. They have on hand contracts for 100 coal cars and 200 box cars for the Jacksonville and South-eastern Railroad, which road has recently come under the control of the Santa Fe. They are also building 75 furniture cars, 42 feet long, for various roads, and a lot of 100 coke cars for the Louisville and Nashville Railroad, as well as 200 ore cars for the Southern trade. Another contract calls for 200 refrigerator cars for the Union Railway Transit Company. The present capacity of the works is 15 cars per day. They manufacture their own car wheels, for which they have a capacity of 120 wheels per day. They employ about 450 men in their works. The main erecting and wood machinery shop is 60 x 708 feet; a smaller erecting shop is 80 x 250 feet, and the foundry 124 x 184 feet. The power is furnished by a 300 horse-power Hamilton-Corliss engine and an Erie engine for the foundry fan, ratters and wheel drop. Mr. Settlement, the president, has been the president of the Litchfield Car Works for 13 years.

Among newly-authorized corporations in Illinois are the following: The Central White Lead Company, Chicago, to manufacture lead, sulphate leads and lead products, &c.; capital stock, \$250,000; incorporators, Keaton Pennington, Erskine R. Morrell and Henry Betner. American Bureau of Mining Information, Chicago, to furnish information concerning American mines and mineral properties; capital stock, \$10,000; incorporators, Vincent A. Macdonald, Berthold Friend and G. Barton Brown. Hydro Pneumatic Power Company, Chicago, to obtain and control patents for the hydro-pneumatic power machines, to manufacture the machines, &c.; capital stock, \$12,000,000; incorporators, Isaac T. Dyer, Richard O. Burke and John R. Coffey. The American Iron Holder Company, to manufacture and sell sad-iron holders and novelties; capital stock, \$10,000; incorporators, C. M. White, C. E. Gaylord and J. W. Dyrenforth. The R. M. Eddy Foundry Company filed a certificate setting forth an increase of their capital stock from \$80,000 to \$100,000, and the Arcade Mfg. Company, at Freeport, certified to an increase from \$12,000 to \$100,000, and to a change of location to Madison, Ill.

We have received from the Marseilles Mfg. Company of Marseilles, Ill., several of their special catalogues covering the various appliances built by them. These include the Hercules horse-power windmills and a long line of agricultural machinery.

The Stickney Oil Burner Company of Portland, Maine, call attention in their '91 catalogue to the increase in the variety of uses to which their system is now applied. They make burners for heating soldering coppers, bolts, riveters, &c.; also burners for steam boilers, oil burning launches and all similar work where kerosene oil is used as the fuel.

The building which the American Arms Company are erecting for their own use at Bluffton, Ala., is 80 x 200 feet, and is nearing completion.

The plant now being erected by the Bluffton Car Wheel Works, at Bluffton, Ala., will have a capacity of 200 wheels per day, and will employ about 50 men.

A stock book has been opened at Niagara Falls, N. Y., for subscriptions to the Rodwell Mfg. Company, now of Buffalo, but formerly of Niagara. Stock to the amount of \$125,000 was quickly taken, and it is probable that the company will return to Niagara.

The Independent Powder Company have recorded articles of incorporation in New Jersey. The concern have a paid-up capital stock of \$100,000, and will manufacture all descriptions of explosives at South Orange, N. J.

The New York Central Iron Works Company of Geneva, N. Y., report that the demand for the Dunning steam and hot water heating boilers is increasing largely. They are also building engines and steam boilers. They have just received a contract for building a 150-horse-power boiler for the Waterloo Woolen Mfg. Company of Waterloo, N. Y. Next season they contemplate rebuilding their works.

There has been a fire at the works of the Harrow Spring Company, at Kalamazoo, Mich., owned by J. B. Wyckoff, J. K. Wagner and H. C. Reed, where harrow and rake teeth are manufactured.

The Chippewa Falls Mfg. Company of Chippewa Falls, Wis., have closed down their works to make general repairs and improvements, and to equip the foundry and machine shop with new machinery. The plant will be idle 30 days.

The Cincinnati, Ohio, creditors of the bankrupt Indianapolis, Ind., Car Works have offered a bonus of \$100,000 if the plant is removed to that city.

The Houston Car Wheel Works, Houston, Texas, are now turning out 72 wheels per day. By May the output of wheels will be about doubled. Cherokee County iron is used.

The Patten Self-Oiling Journal Company, with a capital stock of \$100,000, have been incorporated at Baltimore, Md., by J. S. Patten, Edwin Higgins, J. A. Pierce and others, and will establish axle works.

Lonman Brothers of Chattanooga will establish a stove foundry at Bridgeport, Ala.

The Viaduct Construction Company will establish bridge works at Max Meadows, Va.

The Shenandoah Brass and Iron Works are reported organized at Charleston, W. Va. This company will operate the brass and iron works recently moved from New Jersey. The iron-foundry building will be 100 x 42 feet, the finishing department 120 x 37 feet and the shipping department 70 x 30 feet.

The Iron Range Company have been formed at Cumson Springs, W. Va., to open and operate iron mines in that vicinity. P. B. Minston of Minneapolis, Minn., is president and G. P. Dabnery of Hanover, Va., is secretary.

A company is said to be organizing at Fort Worth, Texas, to establish a factory at some point in Texas for the manufacture of the Mitchell patent prong plow.

The Bealle Coupler Company of Birmingham, Ala., will enlarge their car-coupler factory.

The Virginia Iron and Manganese Company will invest \$500,000 in the establishment of new industries at Eagle Rock, Va., where they propose building a manufacturing town, to be known as Bessemer.

The Michigan Railway Supply Company have commenced the erection of a large factory at Detroit, Mich.

The personal property of the Huntingdon Mfg. Company, at Huntingdon, Pa., has been sold by the receiver at public sale for \$10,000. The purchaser was George B. Orlady, of Huntingdon, who is said to have acted for the Iron Car Equipment Company of New York.

The Lehigh Coal and Iron Company of Superior, Minn., will increase the number of their coke ovens from 50 to 125.

The Schulze Gas Fixture and Art Metal Company, Baltimore, Md., have increased their capital stock from \$100,000 to \$300,000.

The capital stock of the Page Belting Company, Concord, N. H., is to be increased from \$250,000 to \$450,000.

A new nail company with a capital stock of \$100,000 has been organized at Seattle, Wash., by George Gray, formerly foreman in the works of the Pacific Iron and Nail Company, at Oakland, Cal.

Among recently authorized corporations in Illinois are the following: Moffatt Cycle Company; to manufacture and sell all kinds of bicycles; capital stock, \$80,000; incorporators, George D. Moffatt, Albert Kean and William L. Jancey. The Sestalet Company; to manufacture and deal in stoves, hardware, special-

ties, &c.; capital stock, \$300,000; incorporators, Josiah Cratty, Newton F. Gordon and A. E. Manning. The Bain Electric Mfg. Company, at Chicago; capital stock, \$250,000; to manufacture and operate electric machinery, apparatus and supplies; incorporators, Foree Bain, M. F. Allen and B. S. Gray. The Chicago Steel and Specialty Company, at Chicago; capital stock, \$300,000; for the manufacture of steel and iron and their products; incorporators, Harold Sturges, J. S. Ralston and Frank S. Betz. Great Western Locomotive Works, at Chicago; capital stock, \$1,000,000; for the manufacture of locomotives; incorporators, Alfred Skinner, Hugh R. Walker and Thomas A. Wigham. The company propose to build locomotives after a new design invented by Mr. Walker, the chief feature of which is the economy effected in fuel.

PERSONAL.

R. A. Barrett, for several years manager of the Old Alcalde charcoal furnace, owned and operated by the State of Texas, in connection with the State Penitentiary, at Rusk, Texas, has resigned in order to accept the general management of the Cherokee Iron Mfg. Company, at Rusk, where he is superintending the erection of a 50-ton charcoal furnace for the company. Geo. Froescher, late superintendent of the Irondale Furnace, Puget Sound Iron Company, Irondale, Wash., is now in charge of the Old Alcalde.

Thomas W. Simpers, for the past three years assistant secretary of the Standard Iron Company of Bridgeport, Ohio, will shortly sever his connection with that firm, and will remove to Philadelphia for the purpose of engaging in the iron commission business. He has already made arrangements to represent several iron and steel manufacturers located at Wheeling, W. Va.

Jas. B. Ladd has severed his connection with the Pennsylvania Steel Company, and will sail for Europe for his health on the 28th. He expects to remain abroad for six months, and on his return will be connected with Robert Poole & Co., Wilmington, Del.

E. H. Ammidown was re-elected president of the American Protective Tariff League and presented with a service of silver.

The Cheney Bigelow Wire Works Company, at Springfield, Mass., have elected these officers: D. B. Wesson, president; J. H. Bigelow, treasurer; C. B. Holbrook, Jr., clerk; W. D. Stevens, Mrs. E. A. Bigelow and E. C. Southworth.

James K. Verner, for some years secretary and selling agent of the Pittsburgh Forge and Iron Company, died at his residence, No. 939 Penn avenue, Pittsburgh, on the morning of the 14th inst., of typhoid fever. Mr. Verner was in his fortieth year, and was considered one of the best posted men in the iron business. He was a widower, his wife having died about three years ago, and leaves three children to mourn his loss. Mr. Verner was a prominent member of the Masonic fraternity and was connected with a number of other organizations.

The new cruiser Bennington will be the next war ship ready for acceptance by the Government. The Bennington is at present at Chester, Pa., at the yards of Roach & Co., and is all ready for trial. The Bennington is a sister ship of the Concord. The Government requirements are the same as in the case of the Concord—namely, a horse-power development of 3400 horses.

It is proposed making engines of aluminum to develop 34 horse-power, and to be used for directing the movements of a French war balloon of 3000 c. m. capacity, experiments with which are to be made in April next.

Correspondence.

Waste as an Item of Cost

To the Editor.—In the issue of *The Iron Age* for January 1, I notice a statement of "the cost of making steel from \$16 pig iron" from "actual figures, covering a year's work in the Pittsburgh-Wheeling district." One of the items of cost is, "loss in pig metal 15.25 per cent., or \$2.44." This is evidently an oversight in the calculation, and is likely to mislead on a very vital point. You are right in your statement that 15.25 per cent. of \$16 is \$2.44, and that \$2.44 added to \$16 makes \$18.44; but you have probably not noticed that the result in steel would be only 84.75 per cent. of a ton of steel. Now, if 1 ton of iron at \$16 will make 84.75 per cent. of a ton of steel, what will be the cost of a ton of steel? This is a problem very easily worked out. Your error consists in taking it for granted that a ton of iron (2240 pounds) plus 15.25 per cent. (341.60 pounds), which equals 2581.60 pounds, will produce a ton of steel where the loss is 15.25 per cent.; but you can readily ascertain by a little figuring that it will not do it, but that it takes 2643 pounds of iron to make a ton of steel when the loss is 15.25 per cent. I deem it only necessary to call your attention to these figures, as you will be able in a minute to verify my statement. The easiest and simplest way, however, is to work out the problem by proportion: If \$16 worth of pig metal will make 84.75 per cent. of a ton of steel, how much will be the cost of a ton? BELLAIRE.

The Westinghouse Affairs.

A meeting of the Pittsburgh creditors of the Westinghouse Electric and Mfg. Company of Pittsburgh was held in that city on Saturday, January 17. W. B. McLean presided, and Charles A. Wolfe of the N. Baird Machinery Company acted as secretary. Mr. Wolfe submitted a report of a committee which visited Lemuel Bannister, vice-president of the company, and obtained from him a statement of the indebtedness of the Westinghouse Electric and Mfg. Company. This statement showed the amount due the Pittsburgh creditors to be \$147,500, while that due outside creditors footed up \$300,000. This of course does not include the amounts due various banks in different cities. It was also stated that the concern was doing a business of \$15,000 per day, and Mr. Bannister had assured the committee that with proper management the concern could be run at a profit of about \$600,000 per year. The committee then presented the following agreement for signatures:

We, the undersigned creditors of the Westinghouse Electric and Mfg. Company, agree to accept preferred stock at the par value of \$50 per share, to the amount set opposite our names, on the condition that \$1,500,000 be subscribed before February 3, 1891, the amounts to be entered as a credit on the several accounts.

Considerable discussion of a favorable nature then ensued; a majority of the creditors present signed the paper accepting the preferred stock. Those who did not said they would be compelled to consult other members of the firms they represented. The stock taken amounted to about \$65,000, and the committee stated it had promises for about \$25,000 more. During the meeting the question came up as to whether the firms that had recently brought suit for their claims could sell the effects of the company, and thus prevent the unsecured creditors from getting anything. The answer made to this was that the parties that had entered suit could not

secure judgment before the first Monday in February. Previous to that time it will be definitely known whether the efforts of Mr. Westinghouse to raise money in the East by selling preferred stock of the concern would be successful. If he fails in his mission a receiver will be asked for, and this will prevent the creditors who brought suit from obtaining an undue advantage.

Lake Ore Shipments.

Iron Ore of Ishpeming, Mich., has published in a recent issue a report of the ore shipped from the Lake Superior mines during the year 1890. Our contemporary prints in detail the shipments from the different ports and those sent by all rail. The different mines produced the following quantities:

Marquette Range.			
	Tons.		Tons.
American....	21,000	Marquette....	23,692
Buffalo.....	100,464	Milwaukee....	24,763
Cambria.....	80,359	Michigamme..	80,777
Champion....	223,442	Negaunee....	76,488
Cleveland....	331,713	New York....	2,422
Cliff Shafts..	188,776	Prout.....	15,141
Detroit.....	6,080	Prince of Wales....	32,415
Dexter.....	9,136	Pittsburgh & L. Angeline	261,681
East New York	36,431	Queen.....	109,217
Fitch.....	16,550	Republic....	230,065
Foster.....	21,949	Red'n Co....	3,915
Grand Rapids	26,426	South Buffalo	146,383
Humboldt....	23,259	Salisbury....	85,798
Hortense....	16,246	Samson.....	1,218
Imperial....	38,460	Volunteer....	141,524
Jackson....	124,682	Winthrop....	109,576
Lake Superior	318,821		
Lilly.....	31,812	Total.....	3,028,902
Lucy.....	43,483		

Menominee Range.			
	Tons.		Tons.
Armenia....	26,649	Monitor.....	31,139
Aragon.....	46,609	Millie.....	39,232
Chapin.....	742,843	Mansfield....	18,303
Commonwealth	116,786	Manganate....	6,844
Cyclops.....	7,361	Nanaimo.....	3,441
Crystal Falls	3,974	Norway.....	61,717
Curry.....	72,162	Paint River..	62,654
Dunn.....	156,963	Perkins.....	11,971
Florence....	218,570	Pewabic.....	26,991
Great West'n	72,546	Shafer.....	60,133
Hamilton....	17,072	So. Mastodon.	1,476
Half & Half	1,496	Sheridan....	595
Hersel.....	955	Vulcan.....	104,906
Hollister....	2,620	Walpole.....	2,940
Iron River..	155,458	Youngstown.	44,460
Ludington....	97,355		
Mastodon....	66,526	Total.....	2,282,237

Gogebic Range.			
	Tons.		Tons.
Anvil.....	45,690	Montreal....	16,704
Ashland....	435,949	Mt. Hope....	71,488
Aurora.....	246,695	Norrie.....	906,728
Brotherton..	80,486	Odanah.....	1,065
Cary.....	116,203	Pabst.....	172,060
Colby.....	193,038	Palms.....	50,604
Comet.....	2,882	Ruby.....	11,694
Davis.....	1,497	Sec. 33.....	126,963
Eureka.....	23,794	Superior....	36,675
Federal.....	21,150	Sunday Lake	6,010
Father Hen-nepin	63,903	Tyler's Forks	10,683
Germania....	52,000	Windsor....	37,120
Iron Belt....	110,368		
Lowell.....	6,247	Total.....	2,847,786

Vermilion Range.			
	Tons.		Tons.
Chandler.....	336,002		
Minnesota..	532,000		
Pioneer.....	12,012		
Total.....	880,014		

Recapitulation.			
	Tons.		Tons.
From the port of Escanaba.....	3,778,209		
From the port of Marquette.....	1,251,531		
From the port of St. Ignace.....	21,501		
From the port of Gladstone.....	91,095		
From the port of Ashland.....	1,618,396		
From the port of Two Harbors.....	880,014		
By all rail.....	681,158		

Grand total tons from all sources..9,038,939

The output of the year exceeds that of 1889 by 1,746,185 gross tons, a great gain, truly. Too great, considering the amount

of foreign ore that was sent to this country during the year. The Norrie leads the list of mines in amount of tons produced. The growth of business in the different ranges is shown by the following gain over the previous year: Marquette, 394,085 tons; Menominee, 484,473 tons; Gogebic, 831,395 tons; Vermilion, 34,232 tons.

Prices in Chicago.

A comparative statement has been called for of the present selling prices of iron at Chicago and those prevailing in June, 1889, when the lowest prices ever known in that market were reached. The comparison is as follows:

Articles.	June, 1889.	January, 1890.
L. S. charcoal pig.	\$18 @ \$19	\$18 @ \$18½
Local coke pig		
No. 1.....	15¼	15
Local coke pig		
No. 2.....	14½	14½
Local coke pig		
No. 3.....	13½	14
Local coke, Bessemer.....	16½	17
Southern coke, Bessemer No. 1.....	15½	16½
Southern coke, Bessemer No. 2.....	15	15½
Southern coke, Bessemer No. 3.....	14	14½
Southern gray forge.....	13¼	14½
Southern mottled..	13	14
Southern No. 1, soft.....	14¾	15¾
Southern No. 2, soft.....	14¾	14¾
Common bars, mill lots.....	1.60	1.65
March.		
Sheet iron No. 27, at mill.....	2.70 @ 2.75	2.80

It will be seen from this statement that some prices are lower now than the lowest point previously reached, while others are not so low. Southern pig iron is by no means so low, but this is, of course, owing to the miners' strike in that section, which has restricted production. From present appearances, the worst of the present depression is over, and it is not likely that the average price of all kinds of iron will go to so low a point as was seen in the spring of 1889.

The New York Belting and Packing Company.—August Belmont & Co. of New York, Lee Higginson & Co. of Boston and the Manchester and Liverpool Banking Company are offering for subscription 1350 first mortgage 6 per cent. debentures of £100 each, 9500 preference shares of £10 each, entitled to 8 per cent. preferential dividends, and 7000 ordinary shares of £10 each, entitled to dividends up to 12 per cent. per annum. The whole capitalization is £225,000, or \$1,091,250, first mortgage debentures, £200,000, or \$970,000, ordinary shares, £225,000, or \$1,091,250, preference shares and £1000, or \$4850, founders' shares. The price to be paid for the real estate, factories, raw material and finished goods is to be £580,000, or \$2,813,000, the value of the manufactured goods and raw material on hand being guaranteed at \$1,000,000. The profits from 1883 to 1889, inclusive, averaged yearly \$318,785.65, for the year 1889 they were \$421,226.71, and for the five months to June 1, 1890, at the rate of \$504,044.10. On the shares there is payable 10 per cent. on application, the list closing on January 29, 30 per cent. on allotment, 30 per cent. on the 15th of March and 30 per cent. on the 15th of May, the amounts on the debentures being at the terms specified respectively 10, 40, 25 and 25 per cent.

The steel conduits, castings and other iron work for the Broadway cable are now being made at the iron works of the Metropolitan Traction Company.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., January 20, 1891.

Pig Iron.—The week has developed no important change in the condition of this branch of the Iron trade. The curtailment of production has had the effect of stiffening prices, although there is still plenty of good Iron at quoted rates. But the majority of the cheap lots have been taken up, so that even the best buyers have not many opportunities for picking up bargains. There are new brands at comparatively low prices; so also off-grade lots and spot-cash lots, but these are always to be found to a greater or less extent; but it is an undoubted fact that the general market is firm, and makers of some of the standard Iron are beginning to talk of 25¢ advance. This shows the trend of the market, and, while no immediate or very marked improvement appears to be expected, it is generally conceded that bottom has been reached, and that ultimately better prices are only a question of time. The demand is not specially large, although it is of a well-distributed character, showing that consumers are beginning to want Iron, and that in any event stocks in their yards are pretty well exhausted. The absorption of the low-priced lots indicates that large consumers have covered their requirements for the present, so that the demand in the immediate future will probably depend on general business developments, as notwithstanding the very low prices there is no disposition to speculate on future requirements. For the present lots delivered in consumers' yards command prices about as follows:

Ohio Softeners, No. 1x.....	\$19.00	@	\$19.50
Ohio Softeners, No. 2x.....	18.00	@	18.50
Standard Penna, No. 1x.....	17.50	@	18.00
Standard Penna, No. 2x.....	16.50	@	17.00
Medium Penna, No. 1x.....	17.00	@	17.50
Medium Penna, No. 2x.....	16.00	@	16.25
Alabama and Virginia, No. 1x.....	17.00	@	17.50
Alabama and Virginia, No. 2x.....	15.50	@	16.00
Standard Neutral All-Ore Forge.....	14.50	@	15.00
Ordinary Forge Cinder mixed.....	13.50	@	14.00
Charcoal Car-Wheel Iron.....	22.00	@	25.00

Muck Bars.—The market has a firm undertone, but buyers seem very unwilling to meet sellers' prices, which are usually about \$27.50, delivered. Bids are \$26.50 for large lots, with small sales at \$27 @ \$27.25 and no present disposition on the part of sellers to shade these figures.

Steel Rails.—The usual quotation is now \$30, at mills, and although business is as dull as ever, there is no reason to think that it will influence prices. Roads that require Rails, and are in a position to pay for them, can make no serious objection to \$30, while on the part of manufacturers there is every reason why that should be a minimum price. The real cause for the dullness is in some cases the inability of roads to pay for large lots, and in others an unwillingness to part with the money. For the present, therefore, a dull market is almost inevitable, so that the action of Rail manufacturers can hardly do other than to meet with general commendation.

Steel Billets.—There is very little business doing at present, but prices are firm, and for deliveries extending for any length of time they are somewhat higher—say \$28.25 @ \$28.75, delivered. Nail Slabs for immediate delivery and spot-cash payment have been offered at nearly \$1 below these figures, but in ordinary transactions prices are steady at the rates above named.

Bar Iron.—The feeling as regards

prices has not improved. There are so many mills looking for business the buyers can almost make their own terms, although they are by no means anxious to see any general reduction in prices. The real trouble is that there is not business enough to go around, and while this continues it is useless to look for a firmer market. The immediate outlook is not encouraging, and while the trade is certain to have its usual reaction, it will probably be some weeks yet before the turn comes. Prices have already got down to 1.75¢ delivered for 100-ton lots of best refined Iron, and in some cases still lower figures are mentioned for immediate specifications and prompt cash settlements. Smaller lots are quoted at 1.80¢ @ 1.85¢, which are, in fact, the usual asking prices.

Skelp Iron.—Some business doing at 1.82½¢ @ 1.87½¢, delivered, for Grooved Skelp, but no very large lots are inquired for at present, and prospects are not as bright as could be desired.

Plates.—There is a fair amount of miscellaneous business, but orders for large lots are somewhat scarce, although it is thought that a heavier demand will be forthcoming in course of a few weeks. A great many enterprises are on foot, some of which will undoubtedly materialize before long, but in the meantime everybody wants business, and in the eagerness to secure it prices have to suffer. Ordinarily, however, quotations for lots delivered in consumers' yards are about as follows:

	Iron.	Steel.
Ship Plates.....	2.00 @ 2.10¢	2.15 @ 2.20¢
Tank.....	2.00 @ 2.10¢	2.15 @ 2.20¢
Bridge Plate.....	2.05 @ 2.15¢	2.20 @ 2.30¢
Shell.....	2.30 @ 2.40¢	2.40 @ 2.50¢
Flange.....	3.10 @ 3.20¢	2.60 @ 2.70¢
Fire-Box.....	3.75¢	3.75 @ 4.25¢

Structural Material.—The demand is just about fair. There is nothing very pressing, neither are the mills in urgent need of work, and as prospects are somewhat favorable, there is a general disposition to meet the demand without sacrificing prices, which for lots delivered are about as follows: Angles, 2.10¢ @ 2.20¢; Sheared Plates, 2.10¢ @ 2.20¢, and from 10¢ to 20¢ more for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Old Rails.—There is absolutely no business, so that prices are entirely nominal. Buyers say if they wanted Rails \$22.50 @ \$23 would be a full price, but there are neither bids nor offers for seaboard lots. One or two small sales are reported at about \$24, delivered at interior points.

Wrought-Iron Pipe.—The general demand continues good for the season, with a tendency toward increased business in the small sizes, prices for which are steady. At a meeting of the Pipe Association, held in New York on the 15th inst., the following discounts were adopted:

Butt-Welded Black.....	47½ %
Butt-Welded Galvanized.....	40 %
Lap-Welded Black.....	60 %
Lap-Welded Galvanized.....	47½ %
Boiler Tubes.....	50 %

The above quotations are for less than carload lots, with extra discounts as follows:

One carload or less than five.....	5 %
Five carloads or less than 20.....	7½ %
Twenty carloads.....	10 %

Scrap Iron.—There is an improving demand, and with small offerings, prices are firmer, with sales as high as \$23, Philadelphia, for No. 1 Scrap. We quote as follows: No. 1 Railroad Scrap, \$22.50 @ \$23, Philadelphia, or for deliveries at mills in the interior, \$22.50 @ \$23.50, according

to distance and quality; \$15 @ \$16 for No. 2 Light; \$15 @ \$16 for best Machinery Scrap, \$14 @ \$14.50 for ordinary; \$15 @ \$16 for Wrought Turnings, \$10.50 @ \$11 for Cast Borings, and nominally \$25 @ \$26 for Old Fish Plates and \$17 @ \$18 for Old Car Wheels.

Some 60 to 80 gentlemen prominently connected with the Iron trade paid a visit of inspection to the Reading Rolling Mill Company's Works, at Reading, Pa., this forenoon. It was the opinion of many of those present that these works rank with the best in the country in point of equipment, capacity, general facilities and location. They will turn out every description of Structural Iron, and have a capacity of about 40,000 tons per annum. Francis H. Saylor is president of the company, Joseph H. Cofrode vice-president and William Brazier superintendent. Francis H. Saylor, president of the company, member of the firm of Cofrode & Saylor, was born in Schuylkill County, Pa., and is about 46 years of age. He is a graduate of Amherst, Mass., and previous to engaging in the building of bridges, was an assistant engineer on the Philadelphia and Reading Railroad, and was chief engineer of the Bound Brook road at the time it was built. Joseph H. Cofrode, vice-president was born in Dauphin, Dauphin County, Pa., and is about 47 years of age. He resides at Philadelphia. William Brazier, superintendent, was formerly of the Pottsville Iron and Steel Company, and is a man of great experience in his line. The sales agents of the company are J. F. Bailey & Sons of Philadelphia. Cofrode & Saylor commenced the manufacture of bridges as early as 1870. In 1877 they located at Pottstown. At the start they had a pay roll of 18 hands. Now they employ in the bridge department from 1000 to 1500 men, and with the Reading Works between 2000 to 2300, with a monthly pay roll of \$80,000 to \$100,000.

St. Louis.

Office of *The Iron Age*, 214 N. Sixth st.,
ST. LOUIS, January 19, 1891.

Pig Iron.—The general conditions governing this department have materially changed since our last report. The strike in the Alabama district is virtually over, and it is now expected that furnaces which blew out on account of the strike will commence operations again. Whether they will do so or not is a question. It is probable that many of them will, but some will no doubt wait a few months before starting up again. It was thought that the strike would have a beneficial effect on prices, and had it continued a month or six weeks longer it no doubt would have resulted in moving prices upward. As it is, however, they are now at the lowest ebb, and during the past week some very low prices have been made. The outlook is not particularly encouraging, and it is quite probable that the present range of values will continue for the next two months. Should the crop prospect look promising about April 1 a change may take place for the better, but as things are now shaping themselves a steady adherence to present prices is the best that can be hoped for. Consumers are buying from hand to mouth, and have been for the past six months, consequently they have been able to meet the reduced prices of finished material by buying in this manner. The days of large purchases seem to be past, at least so far as this market is concerned, and buyers and sellers alike are gainers thereby, as it is seldom that orders are now countermanded. During the week under review sales have not been over 100-ton lots, and the prices as quoted herewith indicate the market, although these have been shaded

in several instances. We quote as follows for cash f. o. b. St. Louis:

Southern Coke, No. 1 Foundry,	\$15.25 @ \$15.75
Southern Coke, No. 2 Foundry,	14.25 @ 14.75
Southern Coke, No. 3 Foundry,	13.75 @ 14.25
Gray Forge,	13.25 @ 13.75
Southern Charcoal, No. 1 Foundry,	16.75 @ 17.25
Southern Charcoal, No. 2 Foundry,	16.25 @ 16.75
Missouri Charcoal, No. 1 Foundry,	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry,	14.75 @ 15.25
Ohio Softeners,	17.75 @ 19.25

Bar Iron.—There is only a limited amount of trade offered, and mills are compelled to shade their prices to enable them to keep running. Most of the orders now received are for small quantities, and large buyers do not seem disposed to enter the market at the present time. We quote as follows: Lots from mill command from 1.70¢ to 1.75¢. Small lots from store are quoted at from 1.85¢ to 1.90¢.

Barb Wire.—Notwithstanding the dullness in other lines, the demand for Barb Wire is remarkably brisk, considering the season. Mills are not stocking up to any extent, and when the spring trade opens it will find mills with very little stock on hand to meet it. Prices are fairly well maintained, as follows: Painted, 2.75¢; Galvanized, 60¢ additional; carload lots 5¢ $\frac{3}{4}$ cwt. less than above prices.

John H. Heimbencher has been appointed Western sales agent for the Cambridge Iron and Steel Company, with headquarters at St. Louis.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., writing under date January 19, say: The money market having become easier, together with the blowing out of so many large furnaces in the Mahoning and Shenango valleys, would naturally seem good reasons for firmer and even higher prices, but the market here does not show any improvement. The buyers are few who are willing to place orders except to cover contracts. They admit that prices are not likely to go much, if any, lower, but there does not seem to be much apprehension that any sudden advance will take place, and when the change does come they think they will have time to place their orders at old prices. Stocks in consumers' hands are light, and orders for small lots for prompt shipment are being received. No particular class of Iron is called for, and all grades are about equally in demand, but Silvery and Mottled are perhaps the scarcest, with prices only moderately firm. Some Southern Irons are being offered by speculators at 25¢ under furnace quotations, but few sales have been made for any but small lots. With a dull market and prices weak, we quote as follows:

Lake Superior Charcoal, all numbers	\$19.50 @ \$20.00
Lake Superior Coke, Bessemer	18.50 @ 18.75
Katabdin (Maine Charcoal)	23.50 @ 24.00
Lake Superior Coke Foundry, all ore	18.00 @ 19.00
Ohio Blackband (40 per cent.)	18.25 @ 18.75
Southern No. 1	16.00 @ 16.50
Southern Gray Forge	14.25 @ 14.75
Jackson County (Ohio) Silvery, Connellsville Coke	18.50 @ 19.00 4.65

Louisville.

LOUISVILLE, KY., January 19, 1891.

Pig Iron.—The easier tone of the money market and the gradual return of confidence is being shown in the Iron line by increased inquiry for Pig, and while the extent of sales is small, the prospect of good buying is better than for weeks past. Consumers recognize that prices are below cost of production, and that any change in prices to a lower basis

would be so insignificant that it could not affect them in competition in making prices on their product, while on the other hand, the conditions point to at least a firm if not an advancing market. Considerable inquiry is made for warrant Iron, and the reputation gained by warrants as collateral during the stringency in New York, loans being secured on these when the best commercial paper could not be placed, has caused investors to look very favorably on this commodity, and we look for active trading in warrants. We quote:

Southern Coke, No. 1 Foundry	\$14.00 @ \$14.50
Southern Coke, No. 2 Foundry	13.50 @ 14.00
Southern Coke, No. 3 Foundry	13.00 @ 13.50
Southern Coke, Gray Forge	12.50 @ 13.00
Southern Charcoal, No. 1 Foundry	16.00 @ 17.00
Southern Car Wheel	17.00 @ 20.00

Chicago.

(By Telegraph.)

Office of The Iron Age, 58 Dearborn street, CHICAGO, January 21, 1891.

The condition of trade has become much more encouraging. Weak spots are gradually disappearing, and the market no longer shows a decided tendency in buyers' favor. Bottom has been struck in several lines and a reaction has already set in. The tone of the trade has distinctly changed, and even the most conservative are looking forward to a year of great activity and much better prices. This is particularly applicable to finished material, for which orders are daily increasing. The railroads are not yet buying to any extent, and when they come in the market, as they will be obliged to do at no distant day, a considerably increased impetus will be given to the volume of business.

Iron.—The buying movement appears to have reached its maximum for the present. Not many orders are now in sight. Business was very active during the early part of last week, but tapered off toward the close. While Northern Coke Iron was most in demand, a considerable quantity of Southern was taken by buyers, who called principally for soft grades to mix with Northern strong Iron. No. 2 Soft sold down to \$14 and Southern Gray Forge reached \$13.50, but such prices seem to be no longer current. Buyers have at last found that Pig-Iron makers have a minimum below which they will not go. Orders are being refused at very slight concessions asked on present rates. Lake Superior Charcoal is becoming attractive to some consumers at present prices. A very close buyer has just placed an order for his year's requirements at \$18. We quote:

Lake Superior Charcoal	\$18.00 @ \$18.50
Local Coke Foundry, No. 1	15.00 @ 15.50
Local Coke Foundry, No. 2	14.50 @ 15.00
Local Coke Foundry, No. 3	14.00 @ 14.50
Local Scotch	16.50 @ 17.00
American Scotch	18.25 @ 18.75
Southern Coke, No. 1	15.75 @ 16.25
Southern Coke, No. 2	15.25 @ 15.50
Southern Coke, No. 3	14.75 @ 15.00
Southern, No. 1, Soft	15.25 @ 15.50
Southern, No. 2, Soft	14.25 @ 14.50
Southern Gray Forge	14.50 @ 15.00
Southern Mottled	14.00 @ 14.50
Tennessee Charcoal, No. 1	18.50 @ 19.00
Alabama Car Wheel	22.25 @ 23.50
Coke Bessemer	17.00 @ 17.50
Hocking Valley, No. 1	17.50 @ 18.00

Bar Iron.—Inquiries are rather better and some good specifications have been booked. In some instances 1.75¢. Chicago, has been obtained for fair-sized orders, but the market is somewhere in the vicinity of 1.70¢, half extra, for common Bars. Some business is doing in Car Iron at this price, but at the moment inquiries are slack in this direction. Jobbers quote 1.90¢ @ 2¢, full extras.

Structural Iron.—Nothing new has developed, but small orders are sufficiently numerous to keep trade quite active.

Plates, &c.—Good mill orders have been taken since last report. Rates are

now firmer than they have been, as manufacturers seem to be well supplied with work again. Dealers report their business very encouraging, inquiries and sales increasing. Tubes are firmer through the action of the manufacturers. Quotations remain the same, viz.: Nos. 10 to 14 Iron Sheets, 2.75¢ @ 2.80¢; Steel Sheets, 3½¢ @ 3½¢; Tank Iron, 2.60¢ @ 2.70¢; Tank Steel, 2.80¢ @ 2.90¢; Shell Iron or Steel, 3.25¢; Flange Steel, 3.50¢; Fire-Box Steel, 4.25¢ @ 5.5¢; Boiler Rivets, 4¢ @ 4.25¢; Boiler Tubes, 45¢ off for 1½ inch or less; 50¢ off for 2 to 4 inch.

Sheet Iron.—Black Sheets are weak, but the demand is getting better. Makers quote No. 27 Common at 2.80¢ @ 2.85¢ at mill, but some are shading this price for desirable orders. Price from stock is still 3.30¢ @ 3.40¢. Galvanized Iron was very weak a few days since, but has firmed up again under the improving influence of better business, and some makers are already talking higher prices. Small lots of Juniata sell at 62½¢ off.

Merchant Steel.—Inquiries are increasing with some houses, but it is alleged that inducements are being offered. Those maintaining prices find business light. Carriage Tire is being sold at 2.25¢, and lower rates are reported to have been made at some points. We quote Tire Steel, 2.40¢ @ 2.50¢; Open-Hearth Spring, 2.50¢ @ 2.75¢; Bessemer Machinery, 2.20¢ @ 2.30¢.

Steel Rails and Fastenings.—The demand for Steel Rails is improving. Inquiries are more abundant, and the outlook for business is considerably brighter than it has been. The local mills are still standing idle, and it is not yet known when they will resume. Prices are unchanged. Splice Bar contracts are being made, but terms are private. Spikes and Track Bolts are quiet.

Old Rails and Wheels.—Small quantities of Old Iron Rails have been sold at \$23. Old Rails are quoted at \$14 @ \$18.50, but are very quiet. Old Car Wheels have been sold at \$18 by the single carload, but the demand is very light. Dealers' quotations are as follows $\frac{3}{4}$ ton of 2000 lb.: No. 1 Railroad, \$19.50; No. 1 Forge, \$18.50; No. 1 Mill, \$14; Fish Plates, \$23; Axles, \$25; Pipes and Flues, \$14; Horseshoes, \$18; Cast Borings, \$8; Wrought Turnings, \$11.50; Axle Turnings, \$13; Machinery Cast, \$12; Stove Plates, \$9; Mixed Steel, \$10.50; Coil Steel, \$16; Leaf Steel, \$17, and Tires, \$18.

Scrap.—More of a movement is noted and prices are a little stiffer. There is even some inquiry for Steel Scrap. Cast is dull. Quotations: Railroad, \$19.50; Forge, \$18.50; Mill, \$14.50; Borings, \$8.50; Wrought Turnings, \$11.50; Machinery Cast, \$12. Others unchanged.

Metals.—Lake Copper is unchanged at 15.25¢ in carloads. Casting brands are weak; offers at 12¢ have failed to secure business. Spelter is quiet at 5.70¢ quoted. Lead is inactive, but firm, at 4.30¢ @ 4.35¢. Everett & Post furnish following monthly averages of Pig Lead, Chicago, for past year:

January	3.67½¢
February	3.67½¢
March	3.82½¢
April	3.80¢
May	4.10¢
June	4.35¢
July	4.40¢
August	4.45¢
September	4.90¢
October	5.45¢
November	4.85¢
December	4.10¢

The average for the year was 4.28¢, against 3.67½¢ in 1889 and 4.30¢ in 1888, 4.34¢ in 1887 and 4.50¢ in 1886.

Pittsburgh.

Office of The Iron Age, Hamilton Building, (PITTSBURGH, January 20, 1891.

Pig Iron.—Prices continue unsettled, and it looks as if there was an effort being made to bear the market; we hear of sales below our quotations, but they cannot be traced to any reliable source; it is difficult to find out who bought or sold these cheap Irons. It is possible there are still some furnacemen whose necessities compel them to sell. Some of the valley furnacemen who have considerable Iron piled up are holding for better prices. We quote ruling rates as follows:

Neutral Gray Forge.....	\$14.25 @ \$14.50, cash.
White and Mottled.....	13.75 @ 14.00, "
All Ore Mill.....	15.00 @ 15.25, "
No. 1 Foundry.....	16.50 @ 16.75, "
No. 2 Foundry.....	15.50 @ 15.75, "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, "
No. 2 Charcoal Foundry.....	21.50 @ 22.00, "
Cold Blast Charcoal.....	25.00 @ 26.00, "
Bessemer Iron.....	15.75 @ 16.25, "

In regard to Bessemer Iron, it is rumored that sales have been made as low as \$15.50, and even \$15.25, cash, but as already stated, these low-priced sales cannot be verified, and therefore should be taken with several grains of allowance.

Muck Bar.—The dullness noted for some time past continues, and prices are weak and drooping; may be quoted at \$27.50 @ \$28.50, cash, as to quality and delivery.

Manganese.—Small sales of 80 % domestic Ferromanganese at \$63 @ \$64, and the demand is chiefly for small lots for immediate use.

Manufactured Iron.—There is considerable inquiry, which will no doubt lead to an increased business in the near future. At the present time a good many of the mills are pretty well employed, and the outlook is favorable for a good spring trade, which is now about opening up. Prices are weaker, in sympathy with raw material. We quote first-quality Iron as follows: Bars, 1.80¢ @ 1.85¢; Plate and Tank, 2.15¢ @ 2.20¢; No. 24 Sheet, 2.80¢ @ 2.85¢; Grooved Skelp, 1.75¢ @ 1.80¢; Sheared Skelp, 2.5¢ @ 2.10¢; all 60 days, 2 % off for cash.

Nails.—The Cut Nail trade continues unsatisfactory to makers, more in regard to prices than demand, the former in particular. Steel Cut are still quoted at \$1.55 @ \$1.60 for large blocks, say 5000 kegs and upward and desirable specifications, delivered at maker's mill. Wire Nails are firmer, and are now quoted at \$2.05 @ \$2.10 for large lots, delivered at maker's mill, 60 days, 2 % off for cash.

Barbed Wire.—Painted, \$2.60 @ 2.70; Galvanized do., \$3.10 @ \$3.25.

Old Rails.—There is but little doing. We are advised of a sale delivered out in the Mahoning Valley at \$24, but this is considerably below the views of sellers generally. The Pennsylvania Railroad is taking up some Rails, but refusing to sell at anything like present prices. There was a lot of 4000 tons offered here from the West, but the seller wanted \$24 there which would make them \$26.50 @ \$27 here.

Wrought-Iron Pipe.—There is a continued good degree of activity for this season of the year, and the outlook is favorable for a good spring business, which will soon open up, although natural gas companies are not laying nearly as much Pipe as formerly. No change in prices. Discount on Black Butt Weld, 47½ ¢; on Galvanized do., 40 ¢; on Black Lap Weld, 60 ¢; on Galvanized do., 47½ ¢. Boiler Tubes, 1½ inches and smaller sizes, 45 ¢; 2 inches and larger, 50 ¢; Casing, all sizes, 50 ¢ off.

Structural Iron.—Manufacturers report no change in the situation. There is

considerable inquiry, which it is expected will lead to an increased business in the near future, and some of the mills are now pretty well employed. One mill here reports having orders for 11,000 tons Beams. No change in prices. Channels and Beams, 3.10¢; Angles, 2.25¢; Steel Bridge Plates, 2.45¢; Iron Universal Mill Plates, 2.25¢; Refined Bars, 1.90¢ @ 1.95¢.

Merchant Steel.—There is nothing new to report; business fair, while prices remain unchanged. Tool Steel, 8¢ and upward; Crucible Spring, 4¢; Crucible Machinery, 5¢; Open-Hearth Steel, base sizes, 2¼¢ @ 3¢; Bessemer Machinery Steel, 2.40¢; Tire Steel, 2.75¢.

Steel Plates.—While we hear of but little new business having been placed here recently, the mills appear to be pretty busy on old contracts. No change in prices. Fire Box, 4.25¢ @ 4.50¢; Flange, 2.90¢; Shell, 2.70¢; Tank, 2.35¢.

Billets and Slabs.—We can report a stronger market for Billets, and so far as we can learn there are now but few, if any, sellers under \$26. There has been a scheme on hand of late to "bear" the market, sales having been reported as low as \$24.50, which were never made. Slabs about the same in price as Billets.

Wire Rods.—There has been quite a change in the market during the past week, and it was generally unexpected, with a largely increased demand. Sales have been made at an advance of \$1.50 @ \$2 ⅞ ton. We are advised of sales at \$37 @ \$38, whereas a couple of weeks ago they could have been bought for \$35.50 @ \$36. In addition to an increased demand, production has been reduced; the Braddock Rod mill is standing idle, and it is said the one at New Castle, Pa., is in a disabled condition.

Railway-Track Supplies.—Business continues light. Spikes, either Iron or Steel, \$2.10, 30 days, delivered on cars at maker's works; Iron Splice Bars, 1.95¢ @ 2¢; Steel Splice Bars, 2¢ @ 2.10¢; Track Bolts, 2.80¢ with Square and 2.90¢ with Hexagon Nuts.

Steel Rails.—The Rail trade here, as elsewhere, continues dull, having been very much depressed, by the tightness in the money market, which is causing old railroad companies to stop making extensions, and at the same time puts a quietus on the building of new roads. However, the market may improve as the season becomes more advanced.

Old Material.—There is a fair business, but prices as a rule are weak. Sales of No. 1 Railroad Wrought Scrap at \$20, net ton; Cast Scrap, \$14.50, gross; Wrought-Iron Turnings, \$14.50, net; Cast-Iron Borings, \$11.50 @ \$12, gross; Old Car Wheels, \$17, gross; Steel Rail and Bloom Ends, \$17, gross.

Connellsville Coke.—Business has fallen off, owing to the blowing out of so many blast furnaces, but prices remain unchanged, as follows: Furnace Coke, \$1.90; to dealers, \$2.15; Foundry Coke, \$2.30; Crushed Coke, \$2.50 to dealers, \$2.65 to consumers.

Cleveland.

CLEVELAND, January 19, 1891.

Iron Ore.—One effect of the shut down of the valley furnaces has been to greatly curtail shipments of Ore to the consumers. During the past ten days only 14,000 tons have been sent forward from the Cleveland docks, against 32,000 tons for the same week last year. This means that an enormous amount of Ore will be left on the lower lake docks at the opening of navigation this year. It also seems to indicate a considerable falling off in the sales for this year over last season's great records. A

thorough canvass of the Ore headquarters in this city fails to result in any information of importance. Business is expected to remain at a standstill for five or six weeks, or until the furnaces resume operations, and some guess at the future of the Pig Iron market can be safely made.

Pig Iron.—There is a perceptible improvement in the demand for Iron, although there is not the slightest indication of a settlement of the trouble in the Mahoning and Shenango valleys. It is admitted everywhere that with production so enormously curtailed prices can certainly go no lower. Furnacemen seem quite indifferent to the situation—a position that, whether real or affected, is having its effect. It is entirely probable that the furnacemen are, as a matter of fact, in no mood to hasten a settlement of difficulties. Consumption is continually going on, and stocks are getting less. Very little Iron is changing hands; the few transactions occurring involve amounts almost too trivial to warrant attention. A sale of Bessemer at \$6.30, cash, at the furnace is reported.

Old Rails.—The market is a little firmer, although it is not easy to learn the amount obtained when sales have taken place. Sellers at \$26 @ \$26.50.

Scrap.—There is some demand, but not very many sales. No. 1 Railroad Wrought is bringing about \$19.50 @ \$20; Cast Scrap, \$13.50 @ \$14; Axle Turnings, \$13; Wrought Turnings, \$10.50 @ \$11; Old Car Wheels, \$18.50.

Manufactured Iron.—The demand is improving and prices are somewhat firmer. The outlook for the next two or three months is considered excellent.

New York.

Office of The Iron Age, 96-102 Reade street, (NEW YORK, January 21, 1891.

American Pig.—Business has been on a moderate scale, without any important change of prices. The famous "opening prices" of the leading Lehigh company have not yet been promulgated, but it must be noted that they excite little interest now as compared to the attention they commanded five years ago. Southern furnaces seem to have made very little No. 1 and 2 Foundry Iron lately, their offerings being principally of Silver Gray, No. 1 Soft and Gray Forge, in which there has been some business. No. 2 Foundry warrants are being offered on the basis of \$10.75 at Birmingham, which is equivalent to a shade over \$15. No. 1 Soft has been sold on the basis of a shade over \$15.25. We quote standard Northern brands \$16.75 @ \$17.50 for No. 1, \$16 @ \$16.50 for No. 2 and \$14.50 @ \$15.50 for Gray Forge. Southern Iron is \$15.50 @ \$16 for No. 2 Foundry and \$13.75 @ \$14 for Forge.

Ferromanganese.—Interior markets are being supplied now by Pittsburgh, where sales have been made at \$62.50. We quote tide-water lots \$61 @ \$61.50.

Billets and Rods.—There is some inquiry for round lots both of Soft and High Carbon Billets. On the former at least one Eastern mill is quoting close to parity of Western prices, which are a shade under \$25.50 at Pittsburgh, with the majority of large sellers asking \$25.50 for delivery including March, equal to a shade over \$28, delivered at buyers' mill, Eastern Pennsylvania. The lower figures alluded to last week were current only a short time, although sales were made at \$24.50. The market has therefore improved somewhat. In Rods there is some business, but competition is pretty sharp, coming from quarters even in which it is not usually expected. We quote \$38.50 at Eastern sellers' mill.

Steel Rails.—At the meeting of representatives of the Steel-Rail manufacturers,

held in this city last week, the plan outlined in the past in *The Iron Age* was adopted, except that a modification was made in the amount payable per ton for excess over percentages allotted. It is reported that the percentages of one of the groups of mills are not finally adjusted. The announcement that the combination had been formed and is now effective, is, however, decidedly premature, and some time may elapse before it is. While the chances are in favor of the ultimate adoption of the plan, the possibility still exists that the efforts made may come to nothing. The positive statements concerning the negotiations of the two Scranton mills which have gone the rounds are similarly premature. As we reported last week, only preliminary arrangements were perfected. A number of details must still be adjusted before the Lackawanna Iron and Steel Company become the successor of the Lackawanna Coal and Iron Company and the Scranton Steel Company. It is highly probable that the consolidation will be effected, but there is a remote possibility that it may still fall through. A very erroneous impression has been created by the persistent mistake of alluding to the transaction as an "absorption" of the Scranton by the Lackawanna company. It is conceded generally in the Rail trade that the mill of the former company is by far the better, as its record of producing 100,000 tons in six months shows. The position which the Scranton Steel Company have acquired is highly creditable to the technical management of W. W. Scranton of Scranton, and to the commercial ability of Walter Scranton of New York. For its size, the mill unquestionably occupies first rank as a producer in this country, and with Cornwall Pig as the chief raw material, the quality has ranked with that of any other works. Through the efforts of Walter Scranton the company have virtually controlled the whole of the New England market, have taken the business of roads like the New York Central and a number of leading Coal roads, have held the trade of many Southern lines, and captured frequently important Western and Canadian orders. To speak of an "absorption" under such circumstances is to imply that the other participant in the undertaking is the greater. As a matter of fact, the deliveries in 1890 of the "absorbed" member of the consolidation were 40,000 tons greater than those of the "absorber." Sales during the week have aggregated about 20,000 tons by Eastern mills, the bulk being for Eastern roads at private terms. The market is difficult to quote. The majority of sellers name \$29 @ \$30, according to time of delivery, but all lower offers have not yet been withdrawn.

Manufactured Iron and Steel.—The only large business to be closed at an early date is a building at Atlanta, Ga., for which 1500 tons of Beams will be required. Some very low prices are being named in Belgian Beams, which have been offered as low as 2.25¢. The Abbott gun lift for Sandy Hook was taken yesterday by the Continental Iron Works at \$93,750, the other bidders being South Brooklyn Iron Works, \$119,500; Morgan Engineering Company, \$148,050; R. & J. Gray, New York, \$103,000; Quintard Iron Works, \$110,000. Plates are weaker. We quote Angles, 2.05¢ @ 2.10¢; Sheared Plates, 2.20¢ @ 2.25¢; Tees, 2.6¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 2.25¢ @ 2.30¢ for Tank, 2.55¢ @ 2.65¢ for Shell, and 2.85¢ @ 3¢ for Flange, on dock. Bars are 1.75¢ @ 1.9¢, on dock.

Track Fastenings.—The market is irregular, special prices being readily made for any large order. We quote

Spikes \$2 @ \$2.05, Fish Plates 1.70¢ @ 1.75¢, and Bolts and Nuts 2.85¢ @ 3¢.

Old Material.—The market shows no movement whatever. The only lot of any consequence offering is one of 1500 tons, American. Holders of Foreign Rails, of which there is a fair quantity, are asking from \$23 upward, while buyers do not readily name more than \$21.50 @ \$22. Old Steel Rails are held higher, but there has been no business.

Warrant Stocks.—The American Pig-Iron Storage Warrant Company report as follows:

	Tons.
Stock in yard, January 13, 1891.....	64,000
Put in yard for eight days ending January 21, 1891.....	300
Total.....	64,300
Withdrawn eight days ending January 21, 1891.....	1,100
Net stock in yard, January 21, 1891.....	63,200

Frank D. Moffat & Co. of 81 Fulton street, have been appointed representatives in this market of the Tyler Tube and Pipe Company of Washington, Pa. The mill has been started successfully recently.

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA January 19, 1891.

Notwithstanding the slight upward tendency in prices that was manifested at the beginning of the week, the prices that some of the furnaces are quoting would seem to indicate that there was no foundation for it, and figures have dropped back to about the lowest figure that ruled during the past month or so. This condition of affairs can hardly be accounted for, from the fact that stocks are getting very low; but few of the Southern stack that blew out in consequence of the miners' strike will go in again, and there appears to be quite a heavy demand among consumers, especially with the Southern furnaces, all of whom are turning out about their usual quota of work. At this writing the strike at Birmingham is far from being settled, and further trouble is yet in the atmosphere. To sum it all up, the market is not in as good condition as appearances indicated that it would be some week or ten days ago, and a diagnosis of the future would be difficult to make. Notwithstanding this the Southern foundries appear to be all doing well and are contracting for their anticipated wants for one to three months ahead. All of them have been moving along in their usual quiet way, and apparently experienced no trouble in consequence of the late late financial squeeze. An interesting feature to many of the Southern manufacturers is the fact that most of the planters are holding back their cotton for higher prices, which evidently shows that they are in better financial condition than ever before, and many of the foundries and machine shops say that the farmers are promising them a large amount of work for the coming season. The gin makers are also making calculations for a big year's business.

Imports.

Hardware, Machinery, &c.

Am. Copper Company, Mach'y, 1 lot
Baker, Hermann & Co., Arms, cs., 9
Degrauw, Aymar & Co., Chains, cks., 7; do., lengths, 16
Frasse, P. A. & Co., Mdse., cs., 1
Field, Alfred & Co., Mdse., cs., 12
Folk, J. E., Mach'y, cs., 30
Graef Cutlery Company, Cutlery, cs., 1
Hampton, J. W., Jr., & Co., Mach'y, pkgs., 18;
Gun Stocks 11,674
Morris European Exp., Mach'y, cs., 4
Sanderson & Son, Mach'y, bxs., 5
Schroder, Martin, Mach'y, cs., 4
Schoverling, Daly & Gales, Arms, cs., 9
Van den Toorn, Mach'y, pkgs., 21
Vom Cleave & Co., Iron Chain, cks., 15
Wiebusch & Hilger, Iron Chains, cks., 20; Mdse., cs., 4
Order—Chain Mach'y, cs., 10

Coal Market.

The Anthracite market is more quiet, and Bituminous Coal is in better supply, so that apprehensions of scarcity are indulged in no longer. Whether prices are as well maintained is debateable. Soft Coal is reported easier at all points. As a result, the boom in small steam sizes has ceased. The latest price-list for Free-Burning Anthracite is as follows: Broken, \$3.65; Egg, \$3.90; Stove, \$4.15; Chestnut, \$3.75, all f.o.b., these being practically September prices, but sales are heard of at lower figures. Reading's quotations for Free White Ash at Port Liberty are 20¢ per ton above these figures. Anthracite production for the first ten days in January was 959,000 tons, an increase of 42,000 tons compared with last year. Of Bituminous Coal Cumberland reports for the week 114,400 tons, against 108,000 same time in 1890; Beech Creek 53,000 tons, Pocohontas 41,000 tons, Clearfield 28,000 tons.

The Stanton Colliery at Mahanoy Plain has resumed, and the Provost Mines, having been drained off, will be opened up by L. A. Reilly & Co. Four of Reading's collieries at Ashland were shut down 14th inst.

The official figures of Anthracite production for 1890 make the shipments by railroad 35,855,174 tons, an increase over 1889 of 447,464 tons. These are the shipments of Coal by mine owners, and they do not pretend to give the actual amount of Coal mined, which is some 5,000,000 tons greater. In 1889 the amount of Coal shipped by railroad was 35,407,710 tons, while the amount of Coal mined was estimated at 40,665,151 tons, nearly 5,000,000 tons having been for near-by consumption at the mines. The total production of Anthracite Coal in 1890, at the least calculation, is therefore more than 41,000,000 tons. Figures are based, however, on the amount of Coal mined for shipment by railroad, which, as has been said, was 35,855,174 tons. These shipments in recent years have been as follows:

1882.....	29,123,611	1887.....	34,641,017
1883.....	31,793,611	1888.....	38,145,718
1884.....	30,718,296	1889.....	35,407,710
1885.....	31,623,529	1890.....	35,855,174
1886.....	32,136,362		

For the year 1890 the Schuylkill region sent 10,867,800 tons, Lehigh, 6,329,600 tons; Wyoming, 18,658,000, showing no important difference compared with the previous year. The Schuylkill shows the largest gain, but neither the Schuylkill nor the Lehigh region has recovered the loss during the last great strikes. The apparent consumption since 1887 is approximated in the following table:

	1888.	1889.	1890.
Stock Jan-uary 1.....	130,977	652,156	1,026,107
Production....	38,145,718	35,407,710	35,855,174
Totals supply.	38,276,695	36,059,866	36,881,281
Stock Decem-ber 31.....	652,156	1,026,107	535,652
Consumption..	37,624,439	35,033,759	36,345,629

It will be noticed that the consumption of coal has fallen since the remarkable year of production, but it was larger both in 1889 and 1890 than in 1887, when it was 34,882,322 tons.

The tolls or carrying charges on Coal were not essentially changed during last year. The rates from the Wyoming region to New York are \$1.70, and from the Schuylkill region \$1.80. From the Schuylkill region to Buffalo the rates are from \$1.75 to \$2, while to Philadelphia the rates are \$1.80. The distance from the mines to Buffalo is from 250 to 270 miles.

A novelty in Coal is the arrival at this port by the sea route from Philadelphia of two steamers, Panther and Rattlesnake, with 1500 tons of Lykens Valley and

Schuylkill Red Ash, consigned to Percy, Heilmer & Co., the railroad to Port Liberty being obstructed.

Pea Coal is not in market, but quoted \$3 @ \$3.25; Buckwheat, \$2 @ \$2.25, f.o.b.

Metal Market.

Copper.—There has been some increase in the sale of Lake Superior Cakes and Bars, and the market for the metal in those forms is quite steady at 15¢. While there is thus some improvement in requirements for electrical purposes, the demand otherwise continues slow, and moderate quantities of Ingot are still obtained from outside sources at 1/4¢ @ 1/2¢ under the price asked by the mining companies. It is claimed, however, that the amount of cheap outside lots has been considerably reduced of late, and that the general situation is considerably improved. Arizona Ingot may yet be had at 13¢, and common Casting Copper at 11 1/4¢ @ 12¢ here. In point of fact, sales have been made of the latter at those prices, including cost of delivery at buyers' works, and the position of the market for those varieties is hardly as encouraging as that for Lake Superior product. The following comment on the situation, which appears in the annual report of James Lewis & Son, Liverpool, is of interest: "The value of Copper during the coming year will mainly depend upon the extent of the supplies received from the United States. We see no reason why the consumption of Copper during 1891 should be less than during 1890. In fact, it appears likely to prove greater, with the constantly extending use of electricity for lighting, motive power, telephonic and telegraphic purposes, a probable increased consumption of Sulphate of Copper, and an improved demand from India, which took 2000 tons less than last year in 1889. Assuming there is no increase in the consumption, and taking into account the stock of Copper held on French account in smelters' works and elsewhere (not returned in the public stocks) at the commencement of 1890, and the transfer of the stock held in Japan to this country, it is evident that about 50,000 tons more Copper will be required in England and France during 1891, unless present stocks are to be correspondingly diminished. Allowing for a reduction in the public stocks of 10,000 tons—to a level rather less than the average of the years 1886, 1887 and 1888—an increased import of 40,000 tons will be required. Judging from the experience of the past year, during which the average price of G. M. Copper was £54. 5/ per ton, Copper below £55 is not likely to attract increased supplies from any other country but the United States, the large imports from Japan in 1890 being chiefly the stock accumulated and kept back by the Société des Métaux under the influence of the high prices of 1888 and the early part of 1889. Last year the increased production of the United States was 17,000 tons—6000 from Lake Superior, 1600 from Arizona, 8,000 from Montana, and 400 from the other States—but the consumption increased 20,000 tons. This was under the influence of very high prices, Lake Copper ruling for a good part of the year at 17¢ @ 18¢ lb, whereas it is now down to 15¢, a difference of £9. 10 @ ton. It appears probable that there will be an increased output of Copper in Montana, several mines being in course of development, although the quantity of Ore in some of the older ones has been greatly diminished. We doubt if there will be much increase in the Lake Superior output at the present level of prices, the principal part of the increase last year being from the Calumet and Hecla mines, that

of the others being but trifling. Allowing, therefore, for an increased consumption in the United States, chiefly in the form of Copper for electrical purposes (especially as motive power for tramways and railroads), there seems little probability of sufficient Copper coming from that quarter to provide for our estimated deficiency of 40,000 tons and maintain English and French stocks at their normal level of 50,000 tons.

Pig Tin.—The local market has been very quiet throughout the week and prices have undergone scarcely any change. Apparently there is no incentive to speculative action at present, and purchases by jobbers and consumers are evidently governed by imperative requirements, which, at the moment, do not appear to be extensive or urgent. The statistical position, however, has improved the past two weeks and serves to give values some measure of support. Straits Tin in ordinary jobbing quantities is generally quoted at 20 1/2¢ @ 20 3/4¢, but lower prices have been made to the out-of-town trade. In point of fact, small quantities have been sold at but a slight advance on present net cash prices for 10-ton lots. As gauged by quotations on the Metal Exchange, round lots are worth 20.20¢, net cash, for prompt or January delivery. February delivery was quoted at 20.10¢ bid, 20.30¢ asked, and March at 20.20¢ @ 20.30¢.

Pig Lead.—A week ago it might reasonably have been presumed that smelters had the market well under control. Subsequent events, however, present affairs in rather different shape. Just now there seems to be scarcely any demand, while the offering here and in the West is freer than it has been at any previous time since the holidays, and sellers' views are modified considerably. In this market carload lots may be secured without difficulty at 4.40¢ @ 4.45¢ at the present time, and from St. Louis 4.20¢ was wired yesterday.

Spelter.—Upward of 20 carloads of prime Western have been sold at 5 1/4¢, New York delivery, for January shipments since our last review. Additional quantities could be secured at the same price at this writing. As this brief summary of facts would indicate, the market is decidedly weaker, and it may also be noted that, since the initial transactions, business has been slow at the decline. Some very low sales have been made at Pittsburgh to Western Wire mills.

Tin Plate.—Large quantities of Coke Plates have been purchased for future delivery, and the market is strong, with a further advance in prices nearly all along the line. Little improvement is observed in the demand for Bright Charcoals or Terns, and spot operations throughout are still of moderate volume. Prices for spots and futures are drawing nearer together, indicating a stronger position. Quotations for large lots on the spot are as follows: Coke Tins—Penlan grade, 1C, 14 x 20, \$5.40; J. B. grade, do., \$5.55. Bessemer do., \$5.45; Siemens Steel, \$5.60. Stamping Plates—Bessemer Steel, Coke finish, 1C basis, \$5.55; Siemens Steel, 1C basis, \$5.65; IX basis, \$6.65. 1C Charcoals—Melyn grade, \$6.25; for each additional X add \$1.50; Allaway grade, \$6; Grange grade, \$6.12 1/2; for each additional X add \$1. Charcoal Terns—Worcester, 14 x 20, \$5.65; 20 x 28, \$11; M. F., 14 x 20, \$7.75; do., 20 x 28, \$16; Dean, 14 x 20, \$5.25; do., 20 x 28, \$10.50; D. R. D. grade, 14 x 20, \$4.90; do., 20 x 28, \$10; Mansel, 14 x 20, \$5; do., 20 x 28, \$10; Alyn, 14 x 20, \$5; do., 20 x 28, \$10.25; Dyffryn, 14 x 20, scarce; do., 20 x 28, \$10.50. Wasters—S. T. P. grade,

14 x 20, \$4.75; do., 20 x 28, \$9.62 1/2; Abercarne grade, 14 x 20, \$4.70; do., 20 x 28, \$9.50.

New York Metal Exchange.

The following sales are reported :

FRIDAY, January 16.	
32 tons Lead, February.....	4.55¢
25 tons Tin, January.....	20.20¢
50 tons Tin, March.....	20.35¢
SATURDAY, January 17.	
25 tons Tin, January.....	20.25¢
TUESDAY, January 20.	
10 tons Tin, March.....	20.35¢

Financial.

The passage of the Free Coinage bill by the Senate operated as an abrupt check to the improvement previously observed, sterling exchange at once rising near to the shipping point for gold, and some falling off was noticed in the movement of merchandise, indicating a halt. The advance in exchange was explained by the scarcity of bills, the direct effect of cotton speculation in the South. Neither the bank exchanges nor the gross railway earnings indicate pronounced contraction, as compared with a year ago, but speculators of whatever name, whether interested in stocks, silver or merchandise, are in a waiting attitude. Washington advices are to the effect that there is little chance of the Coinage bill passing the House, even if it is considered, while other business is so pressing. In any case it must run the gauntlet of a Presidential veto. That no serious apprehensions are entertained may be inferred from the bank statement, which gave no indications of the hoarding of gold; neither are there any decided indications of preference for such issues of bonds as bear interest expressly payable in gold. Nevertheless, following the example of the Chamber of Commerce, the business men of Boston, the Philadelphia Board of Trade and other commercial bodies are forwarding their protest against further disturbance of the monetary situation. A hopeful sign is the rapid withdrawal of Clearing House certificates, which are now reduced to about \$2,000,000, and money is flowing in from the interior. At all European centers money is accumulating. The Imperial Bank of Germany gained 19,780,000 marks in revenue last week. The Bank of England gained £873,000, and holds £10,000,000 more gold than at this time in 1890. The bank clearings of 58 cities last week show an increase of 7.2 over last year. Outside of New York the increase was 6.7. New York increased 7.3, Boston 2.9, Chicago 18.3, St. Louis 9.4, reflecting a large volume of general trade. President Stickney and President Blackstone are still antagonistic to the Western Traffic Association.

The stock market was lower at the beginning of the week in consequence of realizing sales following the passage of the Free Coinage bill in the Senate and the failure of the bank of England to reduce its rate of discount. An artificial advance in New England was the feature. On Friday, influenced by European buying, there was more strength, and on Saturday, in the final dealings, the market stiffened under the favorable bank statement. On Monday there was a heavy drop in New England, caused by reports of forgeries in connection with the supposed pending transfer of control of the property to the New York, New Haven and Hartford Company. Speculation was more or less affected by news of the failure of the American National Bank of Kansas City, Mo., with a capital of \$1,250,000, one of the largest institutions in the West.

United States bonds were steady as follows:

U. S. 4½s, 1891, registered.....	103
U. S. 4½s, 1891, coupon.....	108
U. S. 4s, 1907, registered.....	120¼
U. S. 4s, 1907, coupon.....	120¾
U. S. currency 6s, 1895.....	110

The weekly statement was very favorable, showing an increase in reserve of \$5,799,575, which increases the amount held in excess of legal requirements to \$10,183,825, the largest sum since January 26, 1889, when the surplus was \$20,014,800. The increase in specie and legal tenders was \$7,762,700 and in deposits \$7,852,500. Loans were contracted \$510,600.

The market for sterling was firm, without much activity. Posted rates closed at 4.85½ @ 4.88.

Bar silver is quoted in London 48½d per ounce and in New York \$1.05½ per ounce.

William Dowd retired from the presidency of the Bank of North America after 17 years' service, and is succeeded by Warner Van Norden, and L. Boskowitz was elected president of the Mechanics' and Traders' National Bank in place of M. Thalmeisinger.

Money during the week averaged about 4% on call. Time loans were more freely offered by institutions other than banks, and some business was done at 5½% for five months. Commercial paper was in good demand for first class. Prime endorsed bills receivable are placed at 6%, and first-class single-name paper 7 to 8%.

The merchandise markets are quiet, and prices of speculative commodities generally are barely maintained. Grain is lower. Spot cotton ½¢ higher. Sugar advanced. Rubber is strong. Export movement slow. Dry goods jobbers notice some improvement, but buyers are conservative.

The eastbound shipments last week from Chicago were 74,810 tons, against 128,096 tons the same week last year.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]
LONDON, WEDNESDAY, January 21, 1891.

Pig-Iron warrants have been traded in moderately and prices have fluctuated within a narrow range. Latest sales were at 47/2 @ 47/4 for Scotch, 42/ @ 42/3 for Cleveland and 53/ @ 53/2 for Hematite. Holders of warrants are calling for delivery of iron, making prompts scarce. The rumor has circulation that a London clique is endeavoring to make a "corner," but nothing definite comes to the surface regarding the alleged movement. Scotch stocks decreased 5598 tons last week, making a reduction of 9769 tons the past fortnight.

Pig Iron has been dull throughout the week. Straits shipments the first half of the month were heavier than anticipated, but the movement during the last half is expected to be smaller. The trade demand continues very steady.

A large business has been done in Copper Warrants at about £53. 5/ for prompts, and there is a decided revival of "bull" speculation. Americans are selling freely, however, and all buying orders here are promptly met. Prices, therefore, do not rise as the statistical position would warrant. There is still an uncertain feeling in some quarters, owing to doubts as to the amount of supply that may come forward from America and the designs of

large European holders. Stocks decreased 1162 tons and the visible supply 610 tons during the first half of the month. Transactions in furnace material have been heavy latterly, including 1100 tons Montana Matte at 10/, 100 tons Anaconda at the same price, 250 tons Montana and 800 tons Anaconda Argentiferous on private terms.

The market for Tin Plate has continued active, large orders having been placed at the higher prices established last week, while the demand is still brisk. The Lewyardarh Works are about restarting.

Hatton & Sons have failed, with liabilities estimated at £53,000.

Scotch Pig Iron.—There is no change in the market for makers' Iron. Very few brands offering and demand light.

No. 1 Coltness, f.o.b. Glasgow.....	52/
No. 1 Summerlee, " ".....	52/
No. 1 Gartsherrie, " ".....	52/
No. 1 Langloan, " ".....	52/
No. 1 Carnbroe, " ".....	52/
No. 1 Shotts, " at Leith.....	52/
No. 1 Glengarnock, " Ardrossan.....	52/
No. 1 Dalmellington, " ".....	50/6
No. 1 Eglinton, " ".....	50/
Steamer freights, Glasgow to New York.	
1/2: Liverpool to New York, 10/.	

Cleveland Pig.—Demand still runs light and prices show little change. Makers quote at 42/3 for No. 3 Middlesborough, f.o.b.

Bessemer Pig.—In prices there has been little change and the demand is still moderate. Makers quote 54/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—A fairly active demand reported, with prices the same as last week. English 20% quoted at 97/6, f.o.b. shipping port.

Steel Rails.—There has been very little doing and prices are unchanged. Heavy sections quoted at £4. 17/6 and light sections £5. 17/6 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—The market very quiet and prices nominal. Makers quote at £4. 15/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—No improvement in the demand and very little change in prices. Bessemer, 2½ x 2½ inches, £4. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Transactions light, but prices held firmly. Bessemer quoted at £4. 17/6, f.o.b. at N. W. England shipping point.

Old Iron Rails.—The market remains very quiet and holders ask former prices. Tees quoted at £3 @ £3. 2/6 and Double Heads £3. 5/, f.o.b.

Scrap Iron.—Sales are small and the demand is no better. Heavy Wrought quoted at £2. 5/ @ £2. 7/6, f.o.b.

Crop Ends.—A small trade passing at about former prices. Bessemer quoted at £3 @ £3. 2/6, f.o.b.

Tin Plate.—The demand continues brisk, and prices remain very firm. We quote, f.o.b. Liverpool:

1C Charcoal, Alloway grade.....	19/3 @ 19/6
1C Bessemer Steel, Coke finish.....	18/ @ 18/6
1C Siemens " ".....	18/3 @ 18/9
1C Coke, B. V. grade.....	17/6 @ 17/9
Charcoal Terne, Dean grade.....	17/3 @ 17/9

Copper.—Less activity to-day, but the market firm. Merchant Bars quoted at £52.

2/6, spot, and £53. 10/, three months' futures. Best Selected, £59. 10/.

Manufactured Iron.—There has been no improvement in the demand and prices still favor buyers. We quote, f.o.b. Liverpool:

Staff, Marked Bars.....	£ s. d.	£ s. d.
Common ".....	@	8 10 0
Staff, Bl'k Sheet, singles.....	@	6 10 0
Welsh Bars (f.o.b. Wales).....	5 17 6 @	7 5 0
		6 0 0

Tin.—The market was firm at the close, but quiet. Straits quoted at £91. 10/, spot, and £91. 17/6 @ £92 for three months' futures.

Lead.—Demand moderate, but prices steady at £12. 15/ @ £12. 17/6 quoted for Soft Spanish.

Spelter.—The demand is better and prices are firmer at £23 @ £23. 5/ for Ordinary Silesian.

Abbott & Clark have been appointed sales agents for the Cambridge Iron and Steel Company, with headquarters No. 8 Wiggins Block, Cincinnati.

The report and statement of accounts of the Middlesborough Company of Kentucky for the period from organization in 1888 to October 31 last states that the sales of land during that period resulted in a net profit of £228,132, out of which two dividends of 10 per cent. each have been paid, leaving an undivided profit of £156,110. This result has been obtained by the sale of less than 6½ per cent. of the company's land. The cost of the unsold land, which is not less valuable per acre than that already disposed of, has been £86. 5/6 per acre, which must be compared with the average price obtained from all sales to date of over £1250 per acre. It is now proposed, in order to put the company's finances on a permanent footing and to enable the company to complete the purchase of additional lands, to increase the capital of the company by the creation of 40,000 new shares of £5, or \$25, each. Of these shares it is proposed that 25,000 shall now be offered to the existing shareholders pro rata at the price of £7. 10/ per share, the remaining 15,000 shares being left for the present in the treasury of the company.

At a meeting of the Board of Directors of the Philadelphia Natural Gas Company, held in Pittsburgh on Friday, January 16, a statement of the earnings and expenses of the company for the three months ending December 31, 1890, was as follows:

Gross earnings.....	\$753,516.20
Operating expenses (including repairs, maintenance, rent of lands, wells, &c.).....	\$162,842.84
New pipe lines and new gas wells (charged to expenses).....	167,145.36
Rents paid leased companies (Chartiers Valley Gas Company, Pennsylvania Natural Gas Company and other companies).....	118,990.48
	\$448,978.68
Net earnings.....	\$304,537.52

The Cambria Iron Company of Johnstown, Pa., have reduced wages 10 per cent.

Clinton Furnace of the Clinton Iron and Steel Company, at Pittsburgh, has been banked down. It is not known when it will go in blast again.

The contract system of working prison convicts in Missouri is strongly opposed by labor organizations.

HARDWARE.

Condition of Trade.

THE PAST WEEK has given some increase in the volume of business, orders coming in more freely. There have been but few changes in price, but the market is characterized by an improved tone in some lines which have been exceptionally low. Travelers are generally out, and are being heard from with reports of satisfactory business conditions in nearly all sections. Collections are fairly good, and the year opens with excellent promise.

Chicago.

(By Telegraph.)

Trade is almost unprecedented for January, and is in fact large enough to compare favorably with the usual volume of business in other months in the year. Some jobbers report a continuous increase in orders daily since about January 8. There is hardly a poor section tributary to this city; every part of the Northwest would seem to be bare of goods, despite the excellent demand of the past year. It will be very remarkable indeed if a year which opens so auspiciously does not prove very prosperous. The contrast with last January is remarkable. At that time prices of staple goods were high and retail merchants hesitated about stocking up. Now prices are so low that no one fears a decline, hence free buying is being done, and staples are in particularly heavy demand. The new price on Screws has been adopted by the trade generally. On January 17 the manufacturers of Sheet Zinc made a reduction of 25 cents per 100 pounds. Sheet Copper is nominally unchanged, but it is reported that some of the manufacturers are not adhering closely to their agreement. The heavy Hardware trade is very active, and the month bids fair to be the heaviest January in this line also. Prices have been advanced about 30 per cent. on Bent Rims, Bent Shaft and Poles by action of the manufacturers.

St. Louis.

(By Telegraph.)

Jobbers of Hardware report a steady, increasing trade from Southern points. Mail orders are large, and the local demand is up to the average. Wire Nails are moving quite freely at \$2.30 for lots from mill. Iron Cut Nails are quoted at from \$1.80 to \$1.85 from store. Barb Wire is in active demand, at from 2.75¢ to 2.80¢ for small lots of Painted from mill. The outlook for a large spring trade, is considered unusually bright.

Notes on Prices.

Wire Nails.—A great many Wire Nails have been bought during the past few weeks, owing to the low prices ruling, and in view of the fact that most of the mills are well supplied with orders, manufacturers are withdrawing their extreme quo-

tations and naming figures slightly higher. The advance in the raw material also tends to stiffen the price. At this writing \$2.10 is understood to be the very extreme for large lots at mill, concessions below this figure being now refused, and \$2.15 may be named as a general factory price for carloads. The low prices on these goods have had the effect of giving them a still more prominent position in the market as compared with Cut Nails. Small lots are still sold from store at \$2.35 to \$2.40.

Chicago, by Telegraph.—Deep chagrin is felt by those who failed to place orders for large lots of Wire Nails because they thought prices would be lower. Last week the manufacturers met at Cleveland and advanced prices to \$2.10, at factory, making their bottom rate at Chicago \$2.25. They state that the requirements of the jobbing trade have been covered for only a short time, and that the new price can be sustained. As Steel Billets and Wire Rods have advanced \$2 or more per ton, it is probable that the recent low prices of Wire Nails have departed for at least several months. Manufacturers' agents are receiving numerous requests to book orders at old prices, but have no discretion in the matter, and jobbers here have reduced their prices on Wire Nails, and now name \$2.25 for small lots, and 5¢ off for carloads, but they are advising their salesmen not to push for business at these rates, as an early advance is expected.

Cut Nails.—During the past week there has been a fair volume of business, but at prices which do not show much improvement. The market has, however, a slightly better tone, and the price of Cut Nails will undoubtedly be helped by better prices for Wire Nails. Quotations in the New York market are still \$1.80, f.o.b. New York, for carloads of Iron or Steel Nails, small parcels from store being quoted at \$1.85 to \$1.90 for Iron, with about 10 cents advance for Steel.

Chicago, by Telegraph.—Cut Steel Nails are quoted at \$1.85 from stock, with 5 cents off for carloads. There is not much demand for Cut Nails. Local manufacturers quote \$1.75 and Wheeling makers \$1.85, Chicago, usual average.

Barb Wire.—The market in Barb Wire is also in better condition, and manufacturers are asking from 5 to 10 cents more per 100 pounds. Small lots in New York are quoted at 3.35 to 3.40 cents, and at mill round lots at 3.05 to 3.10 cents.

Chicago, by Telegraph.—Manufacturers are fast being overloaded with orders, and are likely to find themselves embarrassed to make prompt shipments. Some companies are withdrawing their salesmen for the present, as it is no longer desirable to push for trade. Prices are being advanced, and manufacturers' quotations are now on a level with those made by jobbers, who ask 2.75 cents for small lots of

Painted and 3.30 cents for Galvanized, with 5 cents per hundredweight off for carloads. The manufacturers are still conducting negotiations for the purchase of the patents, but nothing definite has thus far been accomplished.

Gun Implements.—The Bridgeport Gun Implement Company, Bridgeport, Conn., and 17 Maiden lane, New York, have issued a revised price-list on Gun Implements, to be used in connection with their descriptive list of June 1, 1890. Prices have been advanced on the Eureka line and reduced somewhat on the regular line, especially on goods of the better quality. For the convenience of the trade revised prices are given in full-faced type, so as to indicate at a glance where changes have been made. The extent of the changes thus made is clearly shown.

Glass.—There has been no change in the Glass market since our last report. While prices for small quantities of Glass remain at 80 and 5 per cent. discount, carload lots are being placed at lower figures than 80 and 10 per cent. discount. Prices have not recovered from the drop immediately following the failure of the American Window Glass Company to materialize. Orders are being received for immediate requirements only, as building operations are not extensive on account of unfavorable weather.

Washita Stone, &c.—We are advised by George Chase, 107th street and First Avenue, New York, that it is not his intention to advance prices on Washita and Arkansas Stone if he succeeds as he anticipates in getting rough Stone at old prices. As referring to the present condition as seen from his standpoint, we give the following circular which he has recently issued relating to this line of goods:

Being temporarily cut off from my supply of rough Stone by the consolidation of the quarryman at Hot Springs, Ark., and other manufacturers, the object of which is to prevent successful competition and advance prices, I advise my customers not to pay exorbitant prices for Washita Stone, as I have been filling all my spring orders at old prices, which I expect to be able to do again.

In the meantime I would call the attention of my patrons to the Lake Superior Stone which I have been manufacturing and has been quoted in *The Iron Age* for the past 18 or 20 years, but the cost to manufacture exceeded that of Washita Stone, and the prices of Washita Stone were so low that it has not been extensively used. Mechanics who have once used this Stone will use no other.

This Stone I neatly label, and is equal to any Fast-Cutting Washita Stone that will be put on the market by the combination.

Copper Goods.—Owing to the low price of the raw material, a degree of weakness affects the prices of articles into which Copper enters largely. Copper Rivets and Burrs have not yet been openly affected, but are not held with as much firmness as a short time ago.

Tacks.—The Tack market continues in the irregular and demoralized condition which has characterized it for a long time. The tendency also seems to be toward somewhat lower prices, and it is understood that some prominent manufacturers have recently been naming exceptionally low figures on leading goods. There is also much irregularity in the less staple kinds of Tacks, which are sold by the various manufacturers at a considerable range of prices. It is conceded by Hardwaremen that the buying of Tacks requires much attention and care in order to purchase to the best advantage, as it is necessary to scrutinize the discounts of every kind of Tacks, and also to give careful attention to the weights and methods of putting up. The trade will certainly appreciate any action the manufacturers may see their way clear to take looking toward greater uniformity in both of these regards.

Emerson Razor Straps.—We give below a list recently issued by Benjamin F. Badger Strap Company, 292 Washington street, Boston, which represents the varied line of Razor Straps which they are putting on the market. It will be observed that the Genuine Emerson Straps are represented in it, a line of goods which still occupy a prominent place in the market and of which this company are manufacturers. The list, as given below, is subject to a discount of 25 per cent.:

Genuine Emerson's Elastic Razor Straps.

No.	Per doz.
A, Elliptic 17½ inches.....	\$16.00
B, Oval, 13½ in.....	6.25
C, Semi-Oval, 12 in.....	5.75
D, Oval, 12 in.....	5.75
E, Semi-Oval, 12 in.....	5.60
F, Elliptic, 13½ in.....	4.35
G, Elliptic, 12 in.....	5.60

Badger's Emerson Elastic Razor Straps.

No.	Per doz.
A, Elliptic, 17½ inches.....	\$12.00
B, Oval, 13½ in.....	4.65
C, Semi-Oval, 13½ in.....	4.35
D, Oval, 12 in.....	4.35
E, Semi-Oval, 12 in.....	4.15
F, Elliptic, 13½ in.....	4.35
G, Elliptic, 12 in.....	4.15

Full Convex and Elliptic Straps.

No.	Per doz.
80, 13-inch, Enameled Handle, Fancy Leather Case, Embossed in Gold..	\$9.00
79, 12-inch, Elliptic, Leather Case, Embossed.....	8.00
75, 13-inch, Paper Case.....	4.75
76, 12-inch, Leatherette Case.....	4.75
73, 13-inch, Elliptic, Leatherette Case..	4.75
74, 12-inch, Elliptic, Leatherette Case..	4.75

Patent Combination Straps.

(Patented February 25, 1885.)

No.	Per doz.
30, Cushion, Belt and Hone.....	\$4.75
35, 1½-inch Belt, Leatherette Case.....	4.25
25, 1½-inch Belt, Im. Morocco Case.....	4.00
20, Imperial Combination.....	2.00

German Belt Straps.

No.	Per doz.
50, Russia Leather Belt, Red Leather Case, stamped in Gold.....	\$9.00
45, Calf Leather Belt, Black Leather Case, stamped in Gold.....	8.00
40, Calf Leather Belt, Leatherette Case..	6.75
34, 1½-inch Belt, Leatherette Case.....	4.25
85, 1½-inch Belt, Im. Morocco Case.....	3.00
84, Imperial Belt.....	2.00

Patent Cushion Straps.

No.	Per doz.
130, Cushion Combination, Leatherette Case.....	\$5.95
131, Black Enameled Handle, Leather Case, Embossed.....	13.50
100, Fine Leather Finish, Leatherette Case.....	5.20
101, Black Enameled Handle, Leather Case, Gilt Embossed.....	12.00
60, Traveler's, 7½ inches, Gold Embossed Case.....	6.00

Barbers' Swing Straps.

No.	Per doz.
1, Oiled, 2 inches wide.....	\$2.60
2, " 2 " " selected.....	3.00
3, " 2½ " " ".....	3.40
5, Genuine selected Black Horse Hide, 2½ inches wide, packed in single boxes.....	4.25
6, Horse Hide, 2 inches wide.....	3.00
7, Combination Horse Hide and Canvas.....	7.50
8, " Buff Leather and Canvas.....	6.00
9, Combination Russia Leather and Canvas.....	12.00
10, Plain Buff Leather.....	3.00
11, Single Web, Canvas.....	3.00

Boiler Tubes.—At a meeting of the manufacturers of Wrought-Iron Pipe, 15th inst., the discount on all sizes of Boiler Tubes was made 50 per cent.

Business Changes.

THE Prescott Hardware Company, Prescott, Ark., have recently been incorporated. The officers are: Jno. M. Milburn, president; A. M. Denman, vice-president, and Jno. M. Pittman, secretary and treasurer, who in connection with N. B. Waller and J. C. Young constitute the board of directors. The capital of the company is \$20,000, and their business will cover general Hardware, Farm Implements and Machinery.

It is announced under date January 1, 1891, that the business of the Chicago branch of the Upton Nut Company has been sold to the Union Nut Company, who will continue the business at 232 Lake street, under the same local management, assuming and executing all unfilled orders and contracts. All accounts will be settled by the Union Nut Company, and it is intimated that an early remittance of accounts due will be appreciated.

Announcement is made, under date January 2, 1891, that the copartnership heretofore existing between Francis J. P. Tompkins and Walter Adams, under the firm name of Tompkins & Adams, 116 Chambers Street, New York, has been dissolved, and Mr. Adams' interest in all contracts with that firm has been assigned to and assumed by Mr. Tompkins, who will continue the export branch of the business at the above address. The business of the firm will be liquidated by both parties. It is also announced by Walter Adams that he will continue the domestic branch of the business at the same address.

The Parkersburg Hardware and Mfg. Company, Parkersburg, W. Va., have recently succeeded C. B. Smith & Co., of that place. The officers of the new company are Daniel Gould, president; C. B. Smith, vice-president; A. B. Smith, secretary, and T. P. Smith, treasurer. The intention of the company is to carry a full line of Hardware and Agricultural Implements, and to manufacture Stoves, Plows, &c.

W. V. Cooley & Co., Manchester, Ohio, have sold out their business to S. J. Lawwill, who will continue it at the old stand under the firm name of S. J. Lawwill & Co.

A circular has been issued by the Burgess-Frazer Iron and Hardware Company, St. Joseph, Mo., stating that they have succeeded the St. Joseph Iron Company and reorganized the business formerly conducted by that concern. It is proposed to carry a larger stock of goods, including some new lines, and the new firm hope by careful supervision, excellence of material, promptness in shipping and an efficient and capable house organization to merit a liberal patronage.

The report that the Falley Hardware Company, Lafayette, Ind., have sold out to Beach & Co., is incorrect. They have sold out their Iron department, which was

only a small part of their business, and they still continue the general Hardware business, adding to this department the room made vacant by the Iron, and will carry a complete stock of Stamped and Pieced Tin Ware, Japanned Ware, Granite Ware, Hollow Ware, &c.

Announcement is made that the Maslin & Boker Hardware Company, Staunton, Va., have sold out their entire stock of Hardware and fixtures to the Worthington Hardware Company, who will continue the business at the old stand. It is stated that the books of Maslin & Boker Hardware Company will be kept at their former office for a few weeks in charge of their bookkeeper, Floyd Lankford, who is authorized to collect money and receipt in their name.

Barb Wire Patents.

FROM an exceptionally well-informed source we have the following advices in regard to the negotiations which for several weeks have been in progress between leading manufacturers of Barb Wire, with a view to reaching an understanding in regard to the purchase of Barb Wire patents, and the formation of a strong company, under whose license the manufacture should be carried on:

The meeting of Barbed Wire Manufacturers, held in Chicago recently, was for the purpose of arranging for the purchase outright of the patents of the Washburn & Moen Mfg. Company. If the negotiations now pending for the purchase of these patents are successful, it is proposed to form a company to be known as the Columbia Patent Company, who will have exclusive control of these patents. Stock in this company will then be taken by the Barbed Wire Manufacturers and a royalty on every ton of Barbed Wire made by the different concerns will be paid to it. The money to be paid for the purchase of the patents will be paid by assessing each concern that becomes a stockholder in the Columbia Patent Company. The consummation of the deal for the purchase of the patents is now in the hands of a few parties, and while it has not yet been closed in all probability it will be during the present week. We are informed on excellent authority that the negotiations have reached that stage that there is hardly a possibility of failure in the purchase of the patents. The opinion is expressed that if the purchase is made it will have a beneficial effect on the Barbed Wire trade, and that an early advance in prices will be made. At present the business is in such a depressed condition that there is very little, if any, profit in it.

Trade Items.

HAYDOCK & BISSELL, 12 Murray street, and 15 Park place, New York, make an important announcement among the Special Notices in this issue. It relates principally to a large special and peremptory sale of Agate Ware, second quality, by order of Lalance & Grosjean Mfg. Company, on January 27. The desirability of these goods is especially emphasized, and a card from the manufacturers is given in which the statement is made that the goods, though a little faulty in appearance are, so far as durability is concerned, fully equal to the first quality. The advertisement supplies explicit particulars in regard to the sale, which will be without reserve. Announcement is also made that on Wednesday, 28th inst., by order of the same company, a large sale of Stamped, Tinned and Blue and White Ware will take place. A large assortment of Manning, Bowman & Co.'s Pearl Agate and Granite Iron Tea and Coffee Pots,

first and second quality, discarded numbers, will also be disposed of, as well as 30 cases of Brushes, &c. This sale is evidently deserving the attention of the trade.

IT HAS, WE ARE ADVISED, been agreed by the Hardware merchants of Lockport, N. Y., to close their places of business at 7 o'clock in the evening, Saturdays excepted, for a period commencing January 12 and continuing until April 1. The following merchants unite in this agreement: Higgs & Staples, A. D. Pomeroy, J. L. Woodward & Son, Lureman & Spaulding, M. Brady, Burtis & Lambert, Payne & Henderson, G. H. Leary, D. G. McKim, John E. Mack, Webber Bros. and A. L. Yates.

THE STEWART & MATTSO MFG. COMPANY, Philadelphia, Pa., manufacturers of Railroad Car and Ship Trimmings, &c., advise us they anticipate issuing a new catalogue in the near future. It will contain handsome illustrations of Car and Ship Hardware, also of Artistic Brass Work in large variety.

THE HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, Hampton, Va., send a circular illustrating and describing a Garden Wheelbarrow. Accompanying the circular is a letter explaining that these goods are made largely by hand by the boys of the school in the course of their instruction. It is stated that these goods are equal in construction, material and finish to any on the market.

SHEPARD HARDWARE COMPANY, Buffalo, N. Y., pack a Queen City Receipt Book with each of their Lightning Freezers. This book is referred to as being the celebrated collection of Prize Receipts for Desserts, Ice Cream, Fruit Ices, Sherbets, Jellies, Puddings, &c. Attention is directed to the comic receipts contained on the inside of the back cover.

THE MOORE MFG. AND FOUNDRY COMPANY of Milwaukee have a new catalogue in course of preparation which will contain a number of new goods, among them being an improved Elevator Lock and some special designs in Door Hangers. They report a most prosperous year in 1890, their facilities of production having been taxed to supply the demand for their goods. Orders are now coming in for new stocks from a wide stretch of territory, causing the future to look very encouraging.

THE STANDARD TOOL COMPANY, Cleveland, Ohio, issue an 1891 calendar. It is a card 11½ x 14 inches, with eyelet for hanging, containing useful information for mechanics. On this card the calendar sheets are fastened. The information consists of tables, giving sizes of Twist Drills from ¼ inch to No. 80, with decimal equivalents; Tap Drills, showing the different sizes of Drills that should be used when a full thread is to be tapped; speed of Drills, as applied to steel, iron or brass in its normal condition, and other equally valuable matter. The manufacturers state they shall be pleased to send one of these calendars to any shop upon application.

HARDWAREMEN will be interested in the page advertisement of F. A. Herrick & Co., Jackson, Mich., in which they illustrate Herrick's Patent Tool Rack, and announce a reduction of price for 1891. It will be seen, also, that testimonials are given from some Hardware houses who have used the Rack, in which reference is made to its convenience and attractiveness, and the fact that it aids materially in selling the goods. The capacity of the Rack is indicated in the fact that it holds 292 Tools and Handles, while it occupies a comparatively small space. The circular of the manufacturers gives a full de-

scription of it, and enumerates the large assortment of Shovels, Steel Goods, &c., which it contains.

GEO. W. SAFFORD, manager of Huntington-Hopkins Company, Sacramento, Cal., had a rack for Belting made similar to that described in *The Iron Age* of November 13, 1890. An improvement was, however, made in it, having stove truck casters attached to one side at the bottom, so that when the rack is tipped to this side it can be run on the casters in same manner as a stove truck. With this addition it is referred to as very convenient.

T. S. STEWART, who recently retired from the firm of T. S. Stewart & Co., Springfield, Mass., had been, we are advised, in business there for the past 19 years, and had built up a prosperous and growing trade in Springfield and the surrounding towns, with the respect and confidence of the public and the trade generally. He had also the reputation of having one of the best-arranged and best-kept stores in New England, and took a just pride in keeping things up in a neat and attractive manner. He has received many expressions of regard from the trade at his retirement from business. His successors, Boise & Clark, expect to keep up the reputation of the house.

COLEBROOKDALE IRON COMPANY, Pottstown, Pa., have made a change in their method of packing their XX Cold-Handle Sad Irons, which have heretofore been put in telescope card boxes. This method has been abandoned and these Irons are now packed in wood cases, half-dozen sets per case, in the same manner as the Mrs. Potts' Irons are packed.

THE STANDARD LIGHTING COMPANY, Cleveland, Ohio, have put on the market the New Process Sanitary Refrigerator. This Refrigerator they describe as absolutely cleanable and without odor. They also refer to the low temperature it produces and the saving of ice it insures. The factory of the Standard Lighting Company, where they make these Refrigerators, is located in the hardwood district of Wisconsin, where everything is favorable to the manufacture of these goods.

THOS. L. APPLETON, Chelsea, Mass., has added Bench and Molding Planes to his list of manufactured articles. He advises us that these goods do not include the cheaper grades, but are of a quality demanded by the New England trade. These Planes are sold from the list used by other manufacturers of similar goods.

THE WILSON & HOWE COMPANY, Birmingham, Conn., advise the trade, under date January 9, that their conditions are much more favorable than ever before, and that they manufacture a complete line of Forgings for Buggies and Surreys; and that they are constantly adding new and desirable goods to their lists of products. The following are the officers of the new company: John I. Howe, president; Geo. E. Wilson, vice-president; E. J. Keeler, secretary; C. S. Mersick, treasurer; I. P. Howe, manager.

D. W. BOSLEY COMPANY, Chicago, are now located in their new five-story building on Washington Boulevard, and are prepared to supply the entire trade in the United States and Canada with Window Cleaners. John H. Graham & Co., 113 Chambers street, New York, are their Eastern representatives.

CHANGES ARE in progress in the affairs of the Branford Lock Works, Branford, Conn., and their New York house. John Kennedy, oldest son of Thomas Kennedy, founder of the company, and for a long time prominently identified with the early history of Lockmaking in this

country, becomes president, and Underhill, Clinch & Co., 94 Chambers street, New York, will be after February 1 exclusive agents for New York City and vicinity, and will carry a full stock of goods. Their Lock department will be under the charge of A. L. Runyon, retiring president, who will also be the New York representative of the Branford Lock Works, of which he continues to be a director. J. H. Greene, who has been in the New York office for some ten years, giving special attention to the city trade, will be one of the travelers of the company. Under these new arrangements, which are expected to work to the advantage of all concerned, the company will have the best wishes of the trade for their success. The trade in this city express gratification that Mr. Runyon, who has been so long and favorably known, will continue to represent the company.

H. F. OSBORNE, Newark, N. J., manufacturer of Saddle and Harness Makers' Tools, advises us he is about issuing a very complete catalogue of his goods, and hope to have it ready for delivery early in February.

DURING the past year the Odell Hardware Company, Greensboro, N. C., have remodeled their building, which is now double its former size. The new establishment is said to be one of the largest and handsomest in the State.

SURPLESS, DUNN & ALDER, 97 Chambers street, New York, have been appointed regular agents for the Lamson & Sessions Company, Cleveland, Ohio, and will give special attention to export trade.

THE LARGE establishment of Walbridge & Co., Buffalo, N. Y., was completely destroyed by fire on Sunday, 18th inst. The building was a five-story brick, and the fire was first discovered on the third floor. The flames spread with astonishing rapidity and 18 minutes after the alarm had been given the front wall fell in, followed soon after by the remaining walls of the building. It is supposed that the fire had its origin on the third floor, where there was a stove. The estimate of the loss on stock is about \$200,000, on which there is an insurance of \$192,000. The firm have secured temporary offices in the Jewett Building, which adjoined their former establishment, but expect to be started again in a few days.

Trade Topics.

Under the motto, "The Best Advertisement is a Well Pleased Customer," a Western correspondent writes as follows:

Much trade and confidence are lost when merchants are too anxious to sell goods of their own make or articles other than those called for. While it may be true that a merchant can, nine times out of ten, persuade a customer to take what he recommends, it is not a rule to keep in practice. If the thing you recommend is not in every respect just as good as the one called for the customer loses confidence in you, and the next time goes to another place. If you do not keep the article called for in stock, don't push another as a substitute, saying it is just as good, because your margin is greater than on the one called for. A great risk is assumed when a merchant recommends anything, and the only safe course to pursue is to keep in stock the things called for, and confine sales to goods of acknowledged merit—that is, goods which owe their sale to their merit and, therefore, recommend themselves. The one thing necessary and a great secret of drawing trade is to make your customer feel that he has received full value for his money every time he deals with

you. No merchant can expect to get rich on any one sale, and while you might not make as much on the thing called for as "your own," you had better make the smaller profit and hold his trade than to recommend a substitute and lose a customer. It is the large number of sales with a small profit on each that count, and the successful merchant must make every sale, no matter how small, do him good, by sending away every customer with a feeling of confidence that he has received full value for his money and just what he called for. It is the well-pleased customer that is the best advertisement.

Twist Drill Case.

AMONG THE MANY convenient arrangements found in the establishment of the Francis T. Witte Hardware Company, 106 Chambers street, New York, is a case for holding Twist Drills

there are nine rows, these being filled with Brass and Nickel-Plated Screws, both flat and round head.

Cutlery.

IN LOOKING OVER the comments of the English press upon the outlook for 1891 one cannot fail to notice the unanimity of expression as to the effect which the McKinley Tariff bill has had upon the English Cutlery trade. The results are already perceptible in the diminished number of orders for Cutlery from their American correspondents, which shows a decrease in business of something like 60 per cent. for the past three months. The English manufacturers have not been dependent entirely upon the United States for their export trade, as they have found

The workmen employed by Wostenholm & Sons are now working under notice that their employers feel themselves under the painful necessity of reducing wages 5 per cent. At the house of Rodgers & Sons, where 300 men are employed, the workmen have received intimation that in consequence of the serious effects of the American tariff it will be necessary to make a similar reduction. The best class of wares for which the firm is renowned will not be affected prejudicially, but the medium qualities will almost be driven from the markets.

The American manufacturer of Cutlery is now enabled to compete with English goods, notwithstanding the higher wages paid to operators in this country; and the American merchant recognizes the fact. This is forcibly brought out in the course of an interview between a Sheffield manufacturer and a press representative. This gentleman, who has had a large business connection with the United States, remarked that he hardly knew how to start his workmen, as there were no orders waiting for completion. A letter had been received by him that morning from an American customer, which, after declining the manufacturer's quotations, went on to say that with the help of the increased duties the Americans could make a superior Knife than that offered and undersell the English production. A result of this state of affairs is seen in the increased activity among American Cutlery manufacturers, the enlargement of their plants, the increase in the number of their patterns and a feeling of security in the future.

Screw Lists.

We have still a few copies of the January 1st Screw Lists, *The Iron Age* print, which we shall be pleased to send free of expense to any of our subscribers who apply for them. These lists are printed on card, in large clear figures, and will be found convenient for store or office use. They are mailed, in tubes so as to secure their receipt in good condition. Applications will be filled until the edition is exhausted.

Price-Lists, Circulars, &c.

ST. LOUIS STAMPING COMPANY, St. Louis, Mo.: New and desirable goods in Granite Iron Ware, Granite Improved Chafing Dishes, with hot-water pan and nickel-plated lamp and stand, Granite Mikado Tea Kettles, with nickel-plated lamp and stand, Granite Ham Boilers, Granite Windsor Dippers, with improved round handles, Granite Cocoa-Shaped Dippers, Granite Measuring Cups, &c.

WM. P. KELLOGG, Troy, N. Y., Fuller Bros., 33 Chambers street, New York agents: Curry Combs, Curry and Horse Cards, Push and Pull Window Blind Hinges, Curley's Lemon Squeezers, Whip Racks, Boring Machines, Mortising Machines and Gray-Iron Castings. Attention is directed to new and desirable patterns of Curry Combs on pages 17, 22, 31 and 35 of their 1891 catalogue.

WOOD, SMITH & Co., Fort Plain, N. Y.: In connection with an 1891 calendar, send illustrated description of their No. 39 Axles; also a list enumerating the kinds of Axles and Springs manufactured by them.

MERIDEN CUTLERY COMPANY, Meriden, Conn., and 80 Chambers street, New York: Table, Medium and Dessert Knives, in

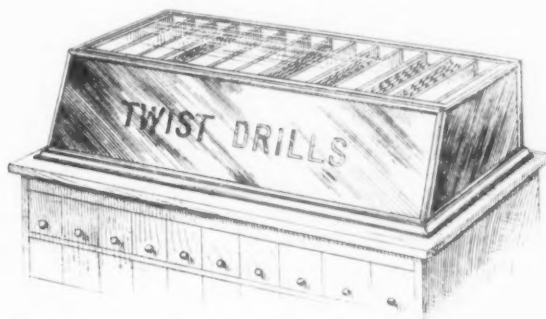


Fig. 644.—Twist Drill Case.

for retailing, of which we give illustrations. This is an ordinary show case, 30 inches long, 15 inches deep and 6 inches high, with mirrors in the front and ends and clear glass on the top, Fig. 644. The case is provided with three drawers, divided into compartments of suitable size, the drawers opening in the rear of the case, Fig. 645. The glass at the top exhibits the Drills in the top drawer, while

a market for their Cutlery in Australia, India and other foreign countries, but it is conceded that such a falling off of business cannot but seriously cripple the industry. The following, from a London correspondent, indicates the position in which the English cutlers are placed:

In connection with the now widely known fact that the McKinley Tariff bill has very seriously interfered with the busi-

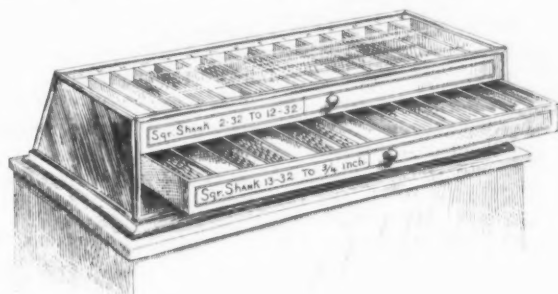


Fig. 645. Arrangement of Drawers in Rear of Drill Case.

the mirrors in the front and ends obscure the less presentable front and ends of the three drawers. The kind and sizes of Drills to be found in the two upper drawers are indicated in Fig. 645, while the lower drawer contains Round-Shank Drills from $\frac{1}{8}$ to $\frac{1}{2}$ inch. The words Twist Drills are formed on the front of the case with enameled adhesive letters, the whole forming a very convenient and attractive piece of store furniture. This case contains 49 sizes of Drills, and its utility amply repays the cost in time and expense in arranging it. The case is situated about half way back in the store, facing the front door. It is set on a case of drawers, of which

ness of the firms engaged in the Cutlery trade, the following details and facts, which have just been made public, will be of interest. At the time of the passage of the bill the large firms fully appreciated the difficulties they were to be called upon to encounter, but on account of the magnitude of their operations they concluded they would feel the pinch less severely than their smaller neighbors. In this they have been disappointed, for such houses as those of Joseph Rodgers & Sons, who have for years been among the cutlers to the Queen, George Wostenholm & Son, Needham Brothers and Crooke & Son, whose names are well known in America by reason of the excellence of their goods, have had to confess that their business has fallen off considerably, and in one instance at least 50 per cent.

Ivory Handles, Solid Steel Silver Plated, Hollow Steel Silver-Plated Handles, with Steel or Plated Blades, Pearl Handle, Silver Plated Nut Picks and Fruit Knives, Butter Knives and Carvers in various styles of Handles, Moits, Shoe Knives, &c.

PARKER & WOOD, Boston: The Yankee Rotary Ash Sifter, Prescott & Mann's Cattle Stanchion and Whitman's Root Cutter. The Cattle Stanchion is referred to as consisting of two parallel bars, one of which is movable, properly connected by cross pieces and turning freely on pivots at the top and bottom.

CHAS. W. PACKER, Philadelphia: Standard, Expert and Model Ice-Cream Freezers; also Confectioners' Machine Freezer. Standard Freezers are made from 2 to 14 quarts; the Expert from 2 to 8 quarts; the Model from 2 to 6 quarts. The Standard Double Action, with fly wheel, are made from 10 to 32 quarts, and with crank in 10 and 14 quarts. Machine Freezers are referred to as being made with especial reference to the wants of confectioners and manufacturers of ice cream in large quantities.

WM. WILCOX MFG. COMPANY, Middletown, Conn.: Common and Patent Padlocks, Plate Locks and Keys. A revised price-list accompanies their catalogue. Attention is called to the fact that they have added to their catalogue and price-list Padlocks from No. 3066 to 3071 inclusive.

P. P. MAST & Co., Springfield, Ohio: Buckeye Grain Drills, Combined Grain and Fertilizer Drills, Broadcast Seeders, Springfield Buckeye Hay Rakes, Latest Improved Buckeye Cider Mills, Buckeye Lard and Wine Presses. Particular attention is directed to their Low-Down Grain Drills, Easy Buckeye Riding Cultivators, Nos. 13, 14 and 15. These they state are entirely new departures in the line of Agricultural Implements.

THE GEORGE D. WINCHELL MFG. COMPANY, Cincinnati, Ohio: High Art, Queen Ann, Keystone and Patent Protector Jar Toilet Ware, Double Thick Tinware, Winchell's Patent Oil Tanks, Cabinets and Star Oil Tanks, Japanned, Stamped and Plain Tin Goods, Coal Vases, Coal Hods, Imperial Water Coolers, &c. Attention is directed to their Old Style, Hand Made, Double Thick, Guaranteed Tinware.

WYCKOFF & RANDOLPH, Morrisonville, Ill.: Miller's Patent Spring Seats. In this Seat spiral springs are used in connection with compensating rods, which the manufacturers claim results in a Seat that will not break from hard driving, overloading, or from the effect of morning frosts, and yet is easy to ride upon and durable.

TUCK MFG. COMPANY, Brockton, Mass.: Steel Hardware, Mechanics' Cutlery, Steel Tempered Springs, Shoe Tools, &c. Among Steel Hardware and Mechanics' Cutlery are noted Screw Drivers, Reamers, Screw Driver Bits, Countersinks, Nail Sets, Punches, Cold Chisels, &c.

WOODS, SHERWOOD & Co., Lowell, Mass.: Sensible Egg Whip, Frying and Culinary Baskets, with G Spring Bails, and Portable Pie or Plate Holder. The Egg Whip is referred to as also answering the purpose of a Cake Mixer, Vegetable Skimmer, or taking doughnuts, eggs, &c., from the hot liquid in which they are cooked.

MAGNOLIA ANTI-FRICTION METAL COMPANY, 74 Cortlandt street, New York: Magnolia Metal, an anti-friction metal for steamship, railroad, dynamo, rolling-mill, high-speed engine, saw-mill, cotton-mill, paper-mill, and all machinery bearings. It is stated that Magnolia Metal is endorsed by United States and German governments. A number of testimonials accompany circulars.

PORTER MFG. COMPANY, Burlington, Vt.: Porter's Patent Window and Door Screen Corners, Sticks for Frames, &c.; also Adjustable Window

screens, the latter being shown in Way's Center Extension, Adirondack Round Metallic Slide and Queen City Flat Metallic Slide.

E. C. STEARNS & Co., Syracuse, N. Y.: Window Screen, Door Screen Frames, Adjustable Window Screens, Door Checks and Spring Hinges. These goods are shown in various styles in their condensed price-list.

C. S. SHATTUCK, Hatfield, Mass.: Breech-loading Shot Guns and Patent Swing Cylinder Revolvers. Attention is directed to his Perfection Side-Snap Single-Barrel Shot Gun, recently put upon the market. A new feature introduced in this Gun consists in doing away with a firing pin, the hammer being made as that of a Revolver, to strike the primer direct. A dealers' list accompanies his illustrated catalogue.

M. SEWARD & SONS, New Haven, Conn.: Carriage Hardware, Axle Clips, Shifting Rails, Dashes, King Bolt, Brace and Yokes, Canopy Standards and Sockets, Fifth Wheels, &c.

VARIETY MACHINE COMPANY, Warsaw, N. Y.: Iron Beam Steel Shovel Plows, all Iron Arches for maple sugar makers, with or without Pan: Also a full line of sugar makers' Fixtures, Pans, Heaters, Regulators, Buckets, Skimmers, Ladders, Steamers and Storage Tanks. Attention is directed to the fact that this company will make Arches of proper size to fit individual Pan or Pans, obviating the necessity of buying new Pans when purchasing an Arch.

SOUTHERN AGRICULTURAL WORKS, Atlanta, Ga.: Steel, Cast and Chilled Plows, Double Shovels, Cultivators, Single and Double Stocks, Cotton Planters, Steel Blades, &c. Their Implements are referred to as being adapted to every different section and soil of the South and Southwest, resulting from experience and knowledge acquired during the past 25 years.

WHEEL SCRAPER COMPANY, Mount Pleasant, Iowa: Wheeled Scrapers, Drag Scrapers, Railroad Plows and Road Graders. It is stated that the Mount Pleasant Wheel Scraper, or Self-Loading and Self-Dumping Cart, has been sent on trial, for distances of over 1200 miles, and has in no case failed to give satisfaction to the purchaser. It is also stated that an ordinary team will handle this Wheel Scraper containing half a yard of dirt with ease.

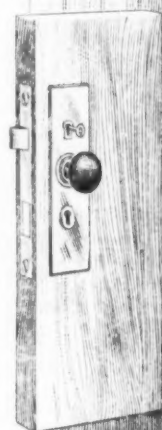
JOSEPH H. SEED, 21 and 23 Centre street, New York: Seed's Reversible Self-Cleansing Water Filters, Matchless Self-Lighting Gas Burner, Alcohol Pocket Cook Stove, Towel Holder, Gas-Tip Cleaner, Wonderful Wire Basket, Economy Sifter Shovel, Vesuvius Gas Stove and Special Novelties.

HAGEN & REID, West Troy, N. Y.: Reid's Sure-Grip Nail Pull and Reid's Little Wonder Tack Pull. These Pulls are referred to as possessing peculiar advantages, and as perfectly adapted to the work they are designed to do.

Sampling Door Locks.

UPON ENTERING the store of the Francis T. Witte Hardware Company, 106 Chambers street, New York, one is impressed with the effective manner in which Door Locks of the finer grades are displayed. On the left of the entrance, at the front of the room, the side wall space is devoted to samples of these goods, as shown in the accompanying illustration. The boards in which the Locks are mortised are nicely finished and of the required thickness of the doors for which the Locks are intended. At the back of the sample-boards are screw eyes, which hook over screw hooks in the wall, allow-

ing the sample to swing, so the trimmings may be seen on either side of the Lock. The size of the sample-board illustrated is 7 x 18 inches. This arrangement not only allows old samples to be replaced by new ones, but also to be taken down for closer inspection without trouble. The purchaser can see how the Lock appears on the door, how the keys and knob work, and has a much better opportunity of comparing any particular pattern with the other samples, and of seeing the roses, knobs and escutcheons comprising each set than he could have if they were shown



A Sample Door Lock.

him in the original package or in a showcase. The large number of these samples also adds largely to the appearance of the store.

An English Manufacturer in America.

W. FEARNEHOUGH, a machine knife manufacturer, of Sheffield, was recently in this country attending the meetings of the Iron and Steel Institute, and in the *Sheffield Telegraph* gives some interesting reminiscences of his trip and refers to his impressions of some leading manufacturing establishments in this country. He refers to the Cutlery in use in some of the hotels in terms which are far from complimentary, the Knives seeming to have been cast handle and blade together and then plated, with the back just as sharp as the front, and describes a visit to Edison's laboratory. He then gives his impressions of the establishment of Henry Disston & Sons, in reply to the inquiries of the reporter:

Of course you visited some of the big works in America?

Yes; one day we went to the works of Henry Disston & Sons, at Tacony. Disston, by-the-by, is a Sheffield man. I am told he is the biggest Saw manufacturer in the world, and after what I saw I can believe it.

Can you tell me something about his works?

Well, first we saw the men melting the steel. It was crucible steel I saw, as made

here, but it is melted with gas instead of coke. I cannot say whether it is water gas or coal gas, but I know that it is water gas that is used for the goffing furnaces. The rolling mill for rolling circulars and sheets is the grandest one I have seen of that description—that is, for circular Saw rolling and sheet rolling. They have some splendid machinery for turning out Saws, and I was very much struck with the machine they have for toothing Hand Saws. I tried to time these Saws going into the machine, but they went in too quick for me. I should say that a Hand Saw went through the machine and was toothed in from three to four seconds. When it had gone through, the machine had done its work thoroughly, and there was no "fash"—by which I mean there was no roughness—and it was perfect in every way. I am told that they put 1500 teeth per minute in these saws.

Then it is a better machine than anything we have in England?

I never saw anything that could do the work half as well for a tenth part so quickly. Then there was the tempering and goffing. Their goffs are different from ours, and are heated by water gas. There is a circular plate about 5 or 6 feet in diameter at the bottom, and the top one is of solid metal, weighing about 7 tons. In the bottom one is a hollow, and inside it is a large fire brick similar to a millstone. Underneath there is the water gas. The bottom plate revolves very slowly, and so keeps the heat regular in the bottom plate of the goff. The Saws are put between these two plates, and I think they are allowed to stay on about a quarter or half a minute, and then the plates are pressed and raised bodily by a hydraulic press, which is fixed underneath the furnace. There is a thermometer and also a clock on the side of the furnace, so that they know the heat exactly and when the Saws should be brought out. The circular Saws were not quite what I expected, although better than I have seen them, but the Hand Saws, Cross Cuts and Pit Saws were nearly perfect. They were making Band Saws 40 feet long and 6 or 7 inches wide, and they are sharpened by automatic machines. Mr. Fearnough also described how the teeth were sharpened by emery wheels, and also added that he was very much struck by the Circular Saws, the teeth of which could be taken out, and if one broke off it could be at once replaced.

Do they make anything else at these works?

Yes, Files, and they have a Rod mill which, I believe, is one of the finest anywhere. As to Saw manufacturing, we have nothing they have not got, but they have one or two things we have not.

Advertising by Retailers.

AMONG ingenious methods of advertising adopted by retail Hardware merchants, a plan pursued by the Schiller House Furnishing Company of Chicago, is worthy of a conspicuous place. G. Dreier, manager of the store, devised a scheme which is set forth in a circular of which the following is a copy:

The Schiller House Furnishing Company (incorporated), dealers in Hardware, Stoves and Kitchen Utensils, 563 N. Clark street, Chicago. Autograph collection card for girls under 14 years of age, entitling the collector of the largest number of autographs to a prize of a full nickel plated Garland range worth \$10, the prize for the second largest number is a half-plated Garland range, worth \$8, and for third largest number a pair of plated Raymond skates, worth \$2.50. To encourage fine penmanship of collectors we

have decided to offer a special prize for best writing of collectors, consisting of a handsome set of Nut Cracks and Picks in plush case, worth \$2.50. Householders will please assist our little collectors in obtaining one of these valuable prizes by signing their name.....

and residence.....

Collector's name.....

Residence.....

Rules for Collectors.—All autographs and collectors' names must be written on blanks furnished by us. All collections must be sent to our store on or before November 25, 1890. Only one name will be allowed in each household. Call at store for blanks and see prizes. The judges of quality of writing will be experts in this branch of scholarship.

THE SCHILLER HOUSE FURNISHING CO.,
G. DREIER, Mgr. 563 N. Clark St.

These circulars were distributed among the girls of the neighborhood under 14 years of age, as specified. They took the circulars among the householders and asked for autographs. Of course every one asked for an autograph read the circular over carefully before signing it. In this way attention was drawn to the store more effectively than if mere hand bills had been distributed. Mr. Dreier states that his scheme worked admirably, both children and adults taking great interest in it. He secured a large number of autographs, pleased the children of the vicinity, caused his store to be very well known to a large number of people, and of course increased his trade.

A. W. Kueken, 221 North Clark street, Chicago, is another ingenious advertiser who embraces every opportunity to interest the public. We are in receipt of a very neat calendar which he is now distributing. He has adopted a Padlock as his trade emblem, and the calendar bears a very artistic reproduction of this piece of Hardware. Mr. Kueken is an earnest believer in the attractiveness of show windows as an effective means of advertising. He makes frequent changes in the goods thus displayed, and always succeeds in doing something striking. At one time he will have nothing but Skates in the window, but the quantity of Skates shown and the way in which they are arranged will catch the eyes of nearly every one passing the store. Sometimes it is a windowful of Bird Cages, again it is an exhibition of Enameled Ware, or nothing but Carpenters' Planes, and so on indefinitely. Of course it requires a good stock to draw on for such a method of window dressing, but not more than well furnished stores carry.

It is Reported—

That Edward P. Johnson, who has for a long time been head salesman for H. C. Burr & Bro., Hardware dealers, Griffin, Ga., will resign his position there and open up a Hardware store in his own name at the corner of Hill street and Staton avenue, his father's old stand.

That John Dixon, Hardware, Nashville, Tenn., has sold out to Owen & Williams.

That M. Griffin & Co. have purchased the stock of Hardware, Stoves, &c., of E. T. Lane, Palatka, Fla. It is intimated that Mr. Lane will probably embark in the Hardware business at Chatanooga, Tenn.

That the Bransford Hardware Company, wholesale dealers in Hardware and Guns, and the Rock City Saddlery Company, Nashville, Tenn., will soon move into their new building on North Market street.

That Frank Foster, who has long been connected with Stevens, Bacon & Co., Hardware merchants, Geneseo, N. Y., has accepted a position with Hamilton & Mathews, Rochester, N. Y.

That David L. McDonald, R. J. Davis and G. Frank Davis have formed a co-partnership as the William G. Smith Hardware Company, for the purpose of continuing at 2053 and 2055 Ridge avenue the business heretofore carried on by William G. Smith & Co.

That Wanser & Mahoffey have purchased the Agricultural Implement business of L. Shaw, Brainerd, Neb., and will continue the old stand.

That P. B. Cary & Co.'s Hardware store at Dunkirk, N. Y., was recently entered by burglars and about \$200 worth of Silverware and Cutlery stolen.

That Walter R. Davis, late of Mexico, has associated himself with C. L. Carpenter, dealer in Hardware at Knoxville, Tenn. The firm will be known under the style of Carpenter & Davis, and will shortly occupy one of the new buildings recently erected on Gay street.

That the French Brothers Hardware and Implement Company have been organized at Pratt, Kan., with a capital of \$15,000. The directors of the company are M. D. L. French, E. T. Hood, Ira Holmes, W. T. Sturtevant, L. C. Miller and George R. Smith, all of Pratt, and M. F. French, of Heppner, Ore.

That Frank Dean is about to purchase the Hardware business of Stewart & Wall, Seymour, Conn.

That McCravey, Timberlake & Co., Huntsville, Ala., dealers in Stoves and Tinware, have dissolved partnership, L. W. McCravey and D. A. Timberlake retiring.

That Frank H. Woodworth, Hardware, Guns and Agricultural Implements, Chattanooga, Tenn., is fitting up a storeroom at 605 Market street, in which by the 15th of this month he will be able to offer a full line of Hardware, making a specialty of Plows, Mechanics' Tools and Electrical Supplies.

That H. H. Roberts, Hardware, Guns, Agricultural Implements, &c., New Boston, Ill., has sold out his business to his son, R. H. Roberts, and will retire.

That Roane & Son, Grenada, Miss., have moved into new and attractive quarters a few doors below their old store.

That C. M. Furber has sold out his Hardware business at Britton, S. Dak. Mr. Britton may locate himself at West Superior, Wis.

That S. C. Oaks, formerly of Gresham, Neb., has purchased the business of L. R. Cottrell, dealer in Hardware, Stoves, &c., Seward, Neb., and will continue the business.

That A. P. Dodge, Hardware and Agricultural Implements, Huntington, N. Y., has leased new premises, and will locate his business there in the spring.

That M. H. Olin, Perry, Wyo., has admitted his son, Walter Olin, as partner in the Hardware business. The firm name will thus become M. H. Olin & Son.

That Pond L. Chandler will soon retire from the firm of Chandler & Wales, dealers in Hardware, &c., at Bridgton, Maine, having sold out his interest to John G. Hamblen.

Exports.

PER SHIP CHARGER, DECEMBER 17, 1890,
FOR SYDNEY, N. S. W.

By A. Field & Sons.—56 boxes Iron Nails, 10 boxes Iron Tacks.
By Coombs, Crosby & Eddy.—3 dozen Wrenches, 28 dozen Locks, 28 dozen Lifters.
By Healy & Earl.—2 boxes Pumps, 6 boxes Planes.
By Welsh & Lea.—26 cases Bolts.
By Strong & Trowbridge.—6 packages, 6 barrels and 2 boxes Lampware.
By E. K. Albutis.—24 dozen Hatchets, 3 dozen Forks, 1 dozen Wringers, 8000 Bolts, 3 cases Hardware, 1 case Carriage Hardware, 4000 Metallic Cartridges, 10 packages Hardware.
By Arnold, Cheney & Co.—10 cases Saddlery Hardware, 8 cases Hames.
By R. W. Forbes & Son.—5 cases Cattle Guards, 40 dozen Wheelbarrows, 83 Carriages, 25 Harrows, 12 packages Pumps, 100 dozen Lampware, 15 Buggies, 5 cases Road Carts.
By F. B. Wheeler & Co.—5½ dozen Brushes, 50,000 Skewers, 5 cases Hardware, 27 dozen Cow Bells, 500 Tinware, 24 dozen Hardware, 25 dozen Wringers.
By R. W. Cameron & Co.—40 boxes Agricultural Implements, 6 dozen Locks.
By A. S. Lascelles & Co.—2 gross Lanterns, 1 dozen Carriages, 7½ gross Pencils, 1 case Tools, 2½ dozen Guns, 6 dozen Vises, 1½ gross Hooks, ½ dozen Scales, 4½ dozen Choppers, 3 dozen Wrenches, 6 dozen Levels, 2 dozen Carriages, 3 barrels Cow Bells.
By McLean Bros. & Rigg.—1½ dozen Iron Vises, 12 dozen Egg Beaters, 9 cases Agateware, 24 dozen Curry Combs, 2 dozen Scales, 4 dozen Saw Sets, 24 gross Pencils, 21 Lawn Mowers, 2½ dozen Meat Choppers, 6 dozen Lanterns, 35 dozen Cow Bells, 22 dozen Mouse Traps, 5 dozen Planes, 6 cases Agateware, 20 dozen Hammers, 3 dozen Miter Boxes, 3 dozen Wrenches, 31 Stoves, 8 boxes Agateware, 4 gross Mouse Traps, 47 dozen Axes, 36 dozen Wire Broilers, 1 case Lamps, 9 Forges, 2 gross Rat Traps, 48 dozen Tacks, 5 sets Axes.
By H. W. Peabody & Co.—8 cases Hardware, 1 case Curry Combs, 3 packages Hardware, 10 packages Lampware, 3 packages Churns, 2 cases Hardware, 4 Ladders, 16 packages Hardware, 6 cases Oil Stoves, 3 packages Rivets, &c., 1 package Hardware, 200 pounds Nails, 8 packages Hardware.
By W. H. Crossman & Bro.—28 dozen Wrenches, 4½ dozen Cages, 3 dozen Scoops, 21 Barrows, 75 dozen Axes, 2 Scales, 104 Emery Wheels and Grinders, 2 cases and 5 packages Hardware, 34 dozen Carpenters' Tools, 14 Clamps, 2 dozen Churns, 1 dozen Corn Mills, 10 Ladders, 6 dozen Traps, 2 cases Lamp Goods, 1 box Stove Parts, 2 Scales, 1 box and 9 cases Hardware, 1 gross Oilers, 9 dozen Hinges, 2 gross Traps, 1 dozen Wringers, 13 dozen Reflectors, 1 Scale, 3 cases Hardware, 1500 pounds Staples, 5½ dozen Blocks, 24 Stoves and Parts, 30 boxes Hardware, 4 dozen Wringers, 12 dozen Hoes, 1 gross Egg Beaters, 3 dozen Sad Irons, 1 dozen Torches, 26½ dozen Cages, 8 packages Lamp Goods, 6 dozen Mattocks, 2 Scales, 12 packages and 16 cases Hardware, ½ dozen Wringers, 10 Rifles, 2 packages Carpenters' Tools, 30 Saws, 1½ dozen Churns, 35 boxes Hardware, 5 cases Hardware.

PER BARK ANNIE REED, DECEMBER 22, 1890
FOR ADELAIDE, AUSTRALIA.

By Winchester Repeating Arms Company.—5000 Metallic Cartridges.
By Meriden Britannia Company.—7 packages Plated Ware.
By Edward Miller & Co.—25 packages and 1 box Lamp Goods.
By R. W. Forbes & Son.—3 Carriage Hardware.
By W. H. Crossman & Bro.—100 reels Barb Wire, 2 Scales.
By Arkell & Douglas.—1072 pounds Rubber Goods, 15,515 pounds Carriages, 212 pounds Rubber Goods, 2 dozen Meat Choppers, 5 Drills, 4 Tire Benders, 21 Lawn Mowers, 193 sets Axes, 2 Washing Machines, 60 dozen Traps.

PER BARK ST. KATHERINE, DECEMBER 20,
1890, FOR MELBOURNE, AUSTRALIA.

By Dunbar, Hobart & Co.—6720 pounds Nails.
By A. Field & Sons.—616 pounds Iron Tacks and Nails.
By Rogers, Smith & Co.—22 packages Plated Ware.
By C. A. Schieren & Co.—1 case Leather Belting.
By Gutta Percha and Rubber Mfg. Company.—18 barrels Rubber Hose.
By Bradley & Hubbard Mfg. Company.—2 casks Lamp Goods.

By H. Disston & Son.—10 cases Hardware, 2 cases Circular Saws.
By R. H. Dana & Co.—10 dozen Axes, 3 cases Rakes.
By Welsh & Lea.—12 cases Iron Bolts.
By Edward Miller & Co.—72 packages Lamp Goods.
By W. K. Freeman.—3 boxes Hardware, 56 packages Scales.
By The F. B. Wheeler Company.—3 cases and 1 package Hardware.
By A. Field & Co.—6 dozen Curry Combs.
By R. W. Forbes & Son.—9 packages Hardware, 42 dozen Lampware, 15 Trucks and Barrows, 5 packages Hardware, 7 dozen Irons and Choppers, 27 Stoves, 10 packages Hardware, 5½ dozen Braces, 5 packages Carriage Hardware.
By W. H. Crossman & Bro.—1 gross Curry Combs, 1 Scale, 2 cases Hardware, 1 cask Lamp Goods, 21 kegs Nails, 12 dozen Picks, 12 dozen Mattocks, 2 cases Hardware, 1 Scale, 6 dozen Bench Screws, 2 dozen Knives, 12 dozen Pliers, 4 cases Hardware, 2 packages Lamp Goods, 3 dozen Files, 2 Scales.
By Strong & Trowbridge.—85 dozen Axes, 25 kegs Nails, 9½ dozen Locks, 7 dozen Hammers, 6 sets Sad Irons, 4 boxes Nails, 25 dozen Hardware, 23 Pumps, 48 dozen Hammers, 146 dozen Dog Collars, 33 dozen Axes, 30 dozen Rake Handles, 27 Emery Wheels.
By McLean Bros. & Rigg.—6 dozen Sinks, 3 dozen Wringers, 5 dozen Pumps, 2000 pounds Nails, 24 dozen Lamp Goods, 27 Stoves and parts, 3 Forges, ½ dozen Tube Scrapers, 39 dozen Rakes, 22 Stocks and Dies, 36 Wheelbarrows, 15 Pistols.
By H. W. Peabody & Co.—39 Corn Shellers, 1 box Plated Ware, 54 packages Hardware, 23 kegs Nails, 1 case Lampware, 33 dozen Traps, 2 cases Bolts, 12 dozen Curry Combs, 17 cases Nails, 1 case Skewers, 4 cases Wringers, 5 cases Corn Shellers.

PER BARK BRITANNIA, DECEMBER 22, 1890,
FOR ADELAIDE, AUSTRALIA.

By John A. Gifford.—1 package Carriage Hardware.
By W. H. Crossman & Bro.—14 packages and 2 cases Hardware, 4 cases Oil Stone, 1 Scale, 10,000 Cartridge Shells, 25,000 Primers.
By Mailler & Quecreau.—5 kegs Nails, 2½ dozen Wringers.
By McLean Bros. & Rigg.—1½ dozen Gate Latches, 3 dozen Tacks, 4 dozen Wringers, 5000 Bolts, 6 Scroll Saws, 11 Stoves, 2 dozen Money Drawers, 2 dozen Animal Traps, 3 dozen Hoes, 3 dozen Scissors, 3 dozen Forks, 3 dozen Pumps, 40 dozen Axes.
By H. W. Peabody & Co.—36 dozen Mouse Traps, 1 case Oil Stoves, 14 packages Hardware, 14 packages Lampware, 1 case Tinware, 1 barrel Plated Ware, 4 cases Hardware, 1½ dozen Wringers, 12 boxes Edge Tools, 160 cases Edge Tools, 4 Revolvers, 2000 Cartridges, 6 dozen Pistols.

Paints and Oils.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

As regards the general distribution of goods, there is little change to note for the week under review. Since the official announcement of revised prices for White Lead by corrodors identified with the National Lead Trust, manufacturers and jobbers have started in on the campaign for orders for various lines of Paints that was delayed more or less pending knowledge as to probable cost of the leading pigments; but the returns thus far have not been striking, except from traveling salesmen in the South, whose initial orders are represented as being very good. In the general line of Animal and Vegetable Oils there is, to all accounts, about the usual distribution for the season, but little movement of round lots for either home trade or export account.

Paints and Colors.

White Lead.—Corrodors report a very good business since the new list, as published last week, went into effect. Many buyers who had permitted their supplies to run unusually low in expectation of purchasing at lower figures than those current prior to the 12th inst., have placed their orders, the aggregate of which is considerable, and the smaller

trade have also purchased to a fair extent. Some degree of confidence is imparted by the higher cost and stronger position of the market for Pig Lead, since this relieves fears of any further reduction in price of the corrodors' product. Some varieties of Mixed Leads are held at former prices, but the better class, for which orders have been placed at prices to be fixed at a certain margin from those adopted for the pure article, are necessarily lower. The movement in the cheap goods has been very fair.

Zincs.—Some little improvement is noted in the distribution of domestic Oxide in jobbing quantities, and heavy consumers have also manifested rather more interest. The movement, however, is of merely fair volume for the season, and prices remain without change. Foreign product is selling rather slowly at the moment.

Colors.—Manufacturers have as yet accomplished nothing in the direction of establishing uniform prices for Paris Green for the coming season, and the indications are that last season's experience will be repeated. For the general line of House Painters' and Grinders' Colors a quiet market is yet to be reported, although business was rather better than during the preceding week, and values show little change.

Miscellaneous.—Prices for Block Chalk remain firm, in the absence of any excessive supply, and the market for Whiting is very steady. Paris White and Clays generally unchanged.

Oils and Turpentine.

Linseed Oil.—City crushers have reduced their price for Linseed Oil manufactured from domestic seed to 56¢, but keep the price for Calcutta Seed product at 62¢. The change is due to competition from Western crushers, whom, it is stated, have been offering their product for future delivery in Eastern markets at "cut" prices, while apparently adhering to the Buffalo agreement, as far as spot stock is concerned. Affairs are thus in a rather complicated condition again, and a conference has been appointed for the 27th inst., for the purpose of endeavoring to straighten out the tangle. Western Oil on the spot is quoted at 53¢, but a "cut" of 2¢ @ 3¢ is said to have been made on offers for future delivery.

Menhaden Oil.—At the annual meeting of the Menhaden Association it was decided, in view of the favorable position, as revealed in statistics presented, to raise prices of crude Oil to 25¢ for merchantable quality to 27¢ for prime light. This advance is generally adhered to, and the market is very firm, but momentarily quiet. The pressed and bleached products are higher, in sympathy with the enhanced cost of crude, and selling very fairly.

Cotton-Seed Oils.—In this line there has been merely a routine business, and the demand is running practically the same as it was a week ago. Prices hold quite steady.

Lard Oil.—Apart from about 1¢ fluctuation in price, due to the course of the market for raw material, the market has been featureless. The movement of supplies and the demand have been of routine character.

Miscellaneous.—Sperm Oils remain in very firm position, but are without important movement. Coconut and Olive Oils are irregular in price, with the advantage in buyers' favor. Cod Oil is scarce and held at higher prices.

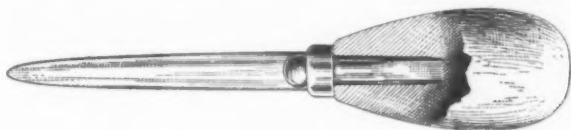
Spirits Turpentine.—In this market there has been little or nothing outside of the routine movement, but greater activity in the South and a rise in values there has caused an advance of about ¼¢. Spot quotations are now 39¼¢ @ 40¼¢, as to style of package.

The Old Put Oyster Knife.

Robert M. Diaz Company, 292 Washington street, Boston, are introducing an oyster knife, as illustrated herewith. A portion of the handle has been removed in the cut, to show the manner in which the blade is secured at the shank. A continuous piece of steel, stamped to shape, is placed on each side of the shank and forced into the handle. The steel

feet of floor space, equipped with improved labor-saving machinery, hot blast dry kilns, &c. They advise us that their vice-president and superintendent have been in this business for the past 20 years. Referring to the material used and manner of construction, they state that all their Kankakee refrigerators and ice chests are made from solid oak, with an inner box of zinc-lined odorless wood—no pine being used. They have a dead air chamber be-

hills, that they are well proportioned, neat in appearance, and that only the best of materials are used in their construction. These mills are finished in two styles, No. 55 in nickel and No. 65 in bronze.

*The Old Put Oyster Knife.*

extends beyond the ferrule a short distance. As a result of this arrangement the manufacturers claim that the knife cannot be broken in the shank nor work loose in the handle. The entire length of the blade and handle is about 7 inches, and the blade is $\frac{7}{8}$ inch wide at the ferrule.

Wilson's Improved Soldering Copper.

G. T. Moore, 112 Chambers street, New York, is introducing an improved soldering copper, as illustrated herewith. It is

tween the walls in combination with a wood fiber filling. They call attention to the great ice-saving qualities, new designs, high finish and other valuable features which they point out as being combined in these goods.

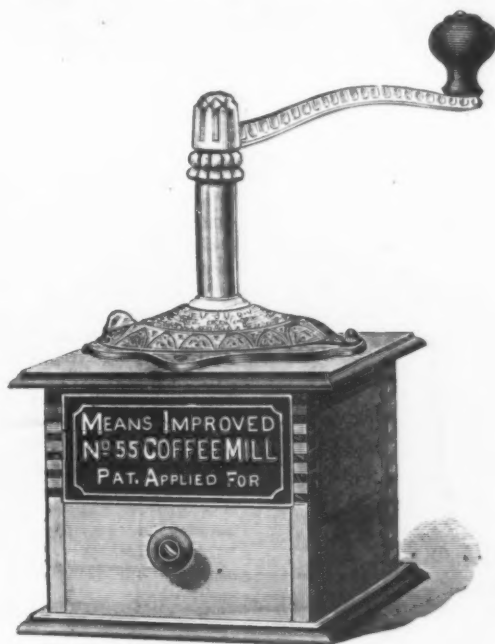
Means Mfg. Company's Improved Coffee Mill.

Means Mfg. Company, Lancaster, Ohio, are putting on the market an improved coffee mill, as illustrated herewith. The manufacturers state that their mills are

*Wilson's Improved Soldering Copper.*

described as made from the best hand-forged Lake Superior copper, with steel bolts and nuts, malleable iron handles, hardwood tips and steel ferrules. It is designed to do away with the multiplicity of tools, as it can be set at any angle. One face is diamond-pointed, the other

constructed on new principles, and that they have endeavored to make the new ideas introduced of advantage to the purchaser. They have provided for the operator a long stem, designed for a perfect and complete place for holding on to the mill while grinding on a table or in

*Means' No. 55 Coffee Mill.*

being oblong or hatchet pattern, which adapts it for the various uses to which a soldering copper is put.

Kankakee Mfg. Company, Kankakee, Ill., and Chicago, have just completed a refrigerator factory with 40,000 square

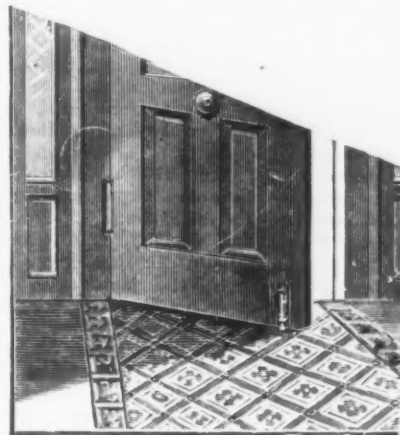
the lap. The stem is also referred to as giving to the mill a double bearing, which prevents the grinding surfaces from rubbing, correspondingly lengthening the life of the mill. The claims are made that these mills will grind coffee or spices finer and with less exertion than unimproved

The Kromo Door Holder.

J. J. Krom, St. Augustine, Fla., is putting on the market a door holder, as illustrated in Fig. 1. It is composed of a base plate, a spring actuated bolt, a spring-operated catch and a rubber yielding foot. Fig. 2 shows its position on an outside

*Fig. 1.—The Kromo Door Holder.*

door. The door may be fastened or unfastened by the toe of the shoe, obviating the necessity of stooping. The manufacturer points out that it will prevent doors from slamming; that it will hold them at any point securely against accidents; and that it does not mar the carpet or floor.

*Fig. 2.—Kromo Door Holder in Position.*

As announced in his advertisement on another page, Mr. Krom is desirous of making arrangements with some manufacturer for putting the door holder on the market more extensively than has yet been done.

The Graham Shank Drill and Chuck.

Graham Twist Drill Company, Detroit, Mich., are placing on the market the Graham Drill and Chuck, as illustrated herewith. The flute or rod of the drill is of the well-known straight-lip increase twist pattern. The shank of the drill is where the novelty comes in. Instead of adopting the straight round shank to be fastened by a set screw or held in the expensive and complicated automatic

can furnish on short notice in carload lots. These are not shown in their catalogue, but are referred to as standard with contractors.

Metallic Frame Window Screens.

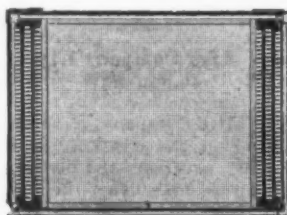
Bigelow & Dowse, Boston, Mass., are New England agents for the Metallic Frame Window Screen manufactured by Howe Metallic Screen Company and illustrated herewith. The screen is described as



Fig. 1.—Graham Grooved Shank Drill.

chucks used for that purpose, or the taper shank, which, though most largely used heretofore, is open to objections, the Graham Company have adopted a device, to the simplicity, convenience and efficiency of which they call special attention. Briefly described, it is this: The double flute or groove of the drill is carried from where the twist ceases to the end of the shank, forming a parallel V-shaped groove on opposite sides of the shank, which grooves are utilized to hold the tool firmly in the patent chucks which accompany the set of drills. The web or bottom of this V-shaped groove is made of the same thickness in all drills from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch, and in all drills above $\frac{3}{4}$ inch the web is again of the same dimensions. The angle of the groove, however, does not vary. The effect of this arrangement is that all drills from $\frac{1}{4}$ inch to $\frac{3}{4}$ inch are accommodated in one chuck (No. 1), and all sizes above in the other (No. 2), two chucks

having a $\frac{1}{2}$ -inch tubular metal frame, with spring adjustable perforated metal sides. The wire cloth is folded in the frame with a double seam. The finish of the frame is



Metallic Frame Window Screen.

a polished gilt and ebony lacquer, giving a neat and tasty effect. The screen occupies but $\frac{1}{2}$ inch on the window stop, in two wooden concaves, which are furnished with each screen, and can be raised independent of the sash or blinds. These

A Walking Toy.

Carolus Bros., Sixteenth and Frederick avenue, St. Joseph, Mo., are introducing a simple but curious mechanical toy, as illustrated herewith. It is described as a



A Walking Toy.

walking baby, having no spring or other mechanism to control its action, but depending entirely on the force of gravity to carry it forward. The body is of tin, with heavy wire limbs loosely joined together at the top near the shoulder, so that their action may be free. The feet are made of scoop-shaped pieces, inverted

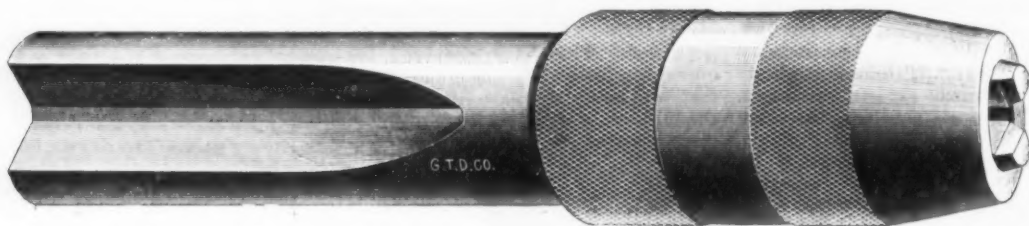


Fig. 2.—The Graham Chuck.

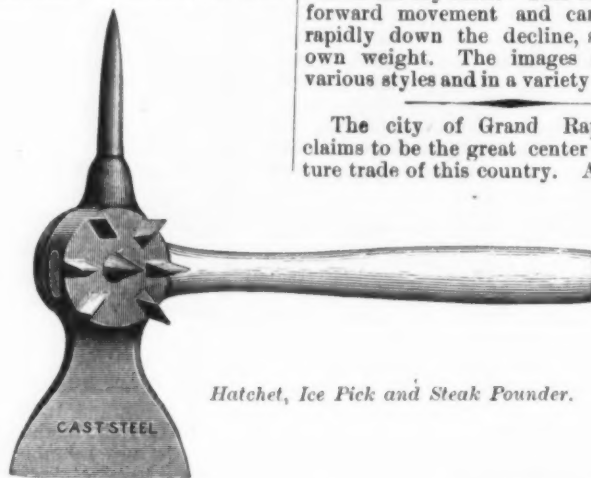
thus covering the full range of sizes. The principles of these chucks can be seen at a glance from the accompanying illustration. The solid jaws fit into the shank grooves, a simple turn of the outside shell clamps them firmly, centering the tool and holding it securely in position. A turn backward releases the drill instantly, no wrench, drift or hammer being required. The chuck shanks are furnished plain, ready to fit to any drill spindle. These chucks are referred to as practically indestructible. The Graham Company lay great stress upon the fact that on account of the new form of their drill they are able to make a better application of the rolling and hot forging process in the manufacture of their goods than is possible with the old-style drills, and describe their drills as made by an ingenious combination of these two systems, which, on account of the thorough working, refining and compacting which the steel receives, especially in the center, where the wear and strain are the greatest, produced a tool that "will cut faster and wear longer" than other drills. Their catalogue gives full description of this interesting line, with a number of testimonials from parties familiar with the goods.

Western Wheel Scraper Company, Mt. Pleasant, Iowa, advise us that they manufacture two-wheel dump carts, which they

screens are made in three sizes, 22, 24 and 26 inches in height, and from 26 to 36 inches wide.

Hatchet, Ice Pick and Steak Pounder.

G. T. Moore, 112 Chambers street, New York, is introducing a hatchet, as illus-



Hatchet, Ice Pick and Steak Pounder.

trated herewith. This is described as being cast steel, nickel plated, with hardwood varnished handle. It is referred to as a very useful tool about the house.

and adjusted so that the image rests on only one foot at a time, allowing the other to swing almost free. When the image is placed on a slight decline, its weight leans forward on one toe and releases the other foot, which falls forward and becomes, in its turn, the one upon which the toy rests. This action causes a forward movement and carries the toy rapidly down the decline, simply by its own weight. The images are made in various styles and in a variety of animals.

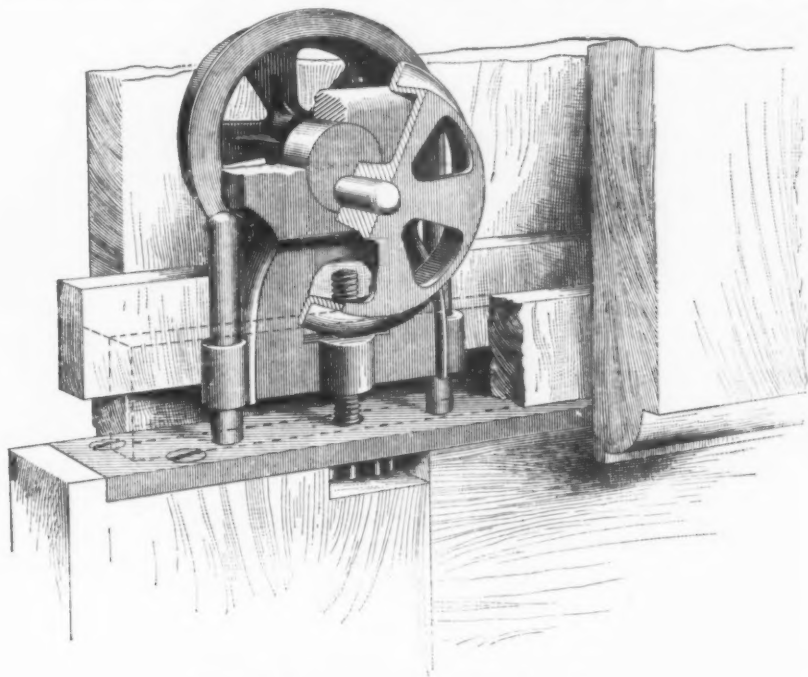
The city of Grand Rapids, Mich., claims to be the great center of the furniture trade of this country. About 30 fac-

tories are located there, and the annual output is between \$3,000,000 and \$4,000,000. Oak is the most popular for furniture of all kinds.

New Parlor Door Hanger.

Bliss, Bullard & Gormley, Chicago, are introducing a new parlor door hanger, as illustrated herewith. The main feature of novelty consists in attaching the independent track wheels to the main axle at

waters of the Hudson River, so that ocean steamers may load at the head of navigation direct from canal boats, was to the effect that each steamer would save \$500 by the operation. It was argued that shipments by the canals from the interior would be greatly augmented. The present



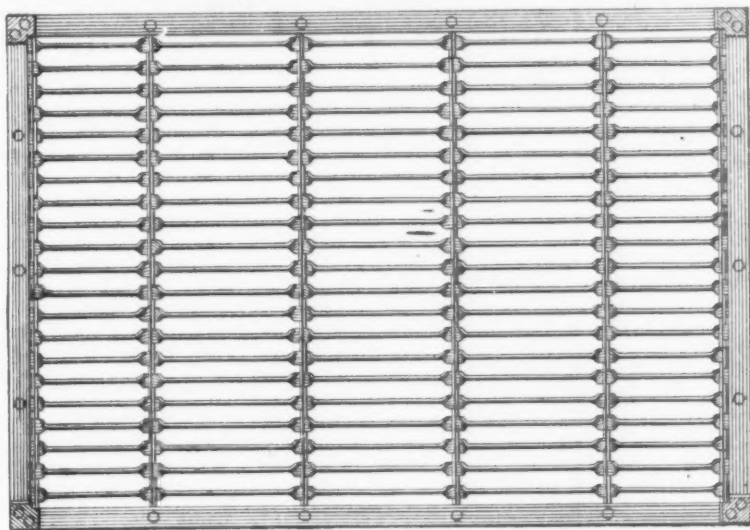
Bliss, Bullard & Gormley's New Door Hanger.

points off its center, which allows them to oscillate in unison, so that as one wheel is thrown up by an irregular or unequal level of the tracks the other wheel will correspondingly be thrown down, at the same time remaining flat upon their respective tracks. Two other points of merit are referred to as recommending this hanger for general use—the side adjustment, which allows the ready adjustment of single doors, which it is stated cannot be done with an end adjustment;

trunk line facilities of the State are inadequate to carry the products of the West to the seaboard. Great development in the commerce of the lakes is predicted.

The Standard Steel Door Mat.

The Standard Wire and Iron Works, 65 Lake Street, Chicago, are putting a patent steel door mat on the market, an illustration of which is herewith presented. This



The Standard Steel Door Mat.

also the neat appearance of the soffit or top jamb of door casing, as $\frac{1}{2}$ inch space only is required between them. The manufacturers are owners of several patent track hangers, and with their large experience in this line are prepared to indorse this hanger as being simple and a most perfect track hanger in all its points of construction.

Testimony taken by the Government Commission at Albany, appointed to consider the subject of deepening the upper

mat is principally composed of $\frac{3}{4}$ -inch flat steel strips. These steel strips stand edge-wise in the mat, as shown in the cut, thus presenting a scraping surface. They are crimped at regular intervals, where they are crossed by wires, which bind them together and hold them in position. The frame is composed of steel angles, to which the body of the mat is riveted. It will be seen that the bars are so arranged that they cannot become clogged with snow or dirt. Every part is perfectly smooth, no sharp points sticking up to tear clothing or

cause accidents. The mat can be used inside as well as outside of any door, being only $\frac{3}{4}$ inch high. It is galvanized after it is put together, so that it cannot rust. Eight regular sizes are manufactured, but the company are prepared to make any size that may be ordered.

The Treasury Department has authorized the allowance of the usual drawback on nails made from imported materials and used in connection with domestic lumber in the manufacture of cases or boxes exported as covering for oil in tin cans.

France is suffering almost as much as Germany from the overcrowding of the learned professions. Civil and mining engineers are so numerous that hundreds of them are seeking eagerly petty positions in mines and factories.

CONTENTS.

Hoisting Engine. Illustrated.....	139
Shop Notes.....	140
The Lash and Johnson Direct Process.....	141
A New Steel Car.....	141
1200-Ton Hydraulic Testing Machine. Illus.	142
The Electric Magnetic Reciprocating Engine.	145
The Proposed Denver Steel Works.....	146
The Senate Silver Bill.....	146
A Remarkable Anti-Friction Screw. Illus.	147
The Valley Shut-Down.....	147
The Use of Natural Gas.....	148
New Publications.....	148
On Sulphur in Bessemer Steel.....	148
The Washburn-Moen Company's Western Move.....	149
Electrical Sheet-Metal Former. Illustrated.	150
Contraction as a Quality Measure.....	151
The Week.....	153
Editorials:	
The Steel-Rail Trade.....	154
The West is Prosperous.....	154
Shall Pooling be Legalized?.....	155
Lake Superior Ore Profits.....	155
Heavier Steel-Rail Sections.....	155
Manufacturing: Iron and Steel, Machinery, Hardware, Miscellaneous.....	156-158
Personal.....	158
Correspondence:	
Waste as an Item of Cost.....	159
The Westinghouse Affairs.....	159
Lake Ore Shipments.....	159
Prices in Chicago.....	159
The New York Belting and Packing Company	159
Trade Report: Philadelphia, St. Louis, Detroit, Louisville, Chicago, Pittsburgh, Cleveland, New York, Chattanooga, Imports, Coal Market, Metal Market, New York Metal Exchange, Financial, British Iron and Metal Market.....	160-165
Hardware: Condition of Trade, Notes on Prices, Business Changes, Barb Wire Patents, Trade Items, Trade Topics, Twist Drill Case (Illustrated), Cutlery, Screw Lists, Price-Lists, Circulars, &c., Sampling Door Locks (Illustrated), An English Manufacturer in America, Advertising by Retailers, It is Reported—Exports.....	166-172
Paints and Oils.....	172
The Old Put Oyster Knife. Illustrated.....	173
Williams' Improved Soldering Copper. Illus.	173
Means' Mfg. Company's Improved Coffee Mill. Illustrated.....	173
The Kromo Door Holder. Illustrated.....	173
The Graham Shank Drill and Chuck. Illus.	174
Metallic Frame Window Screens. Illustrated.	174
Hatchet, Ice Pick and Steak Pounder. Illus.	174
A Walking Toy. Illustrated.....	174
New Parlor Door Hanger. Illustrated.....	175
The Standard Steel Door Mat. Illustrated.	175
Current Hardware Prices.....	176-181
Current Metal Prices.....	182

CURRENT HARDWARE PRICES.

JANUARY 21, 1891.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Adjusters, Blind.

Domestic..... \$ doz \$3.00, 33¢
Excelsior..... \$ doz \$10.00, 50¢10¢25¢
Washburn's Self-Locking..... 20¢20¢10¢

Ammunition.—

Caps, Percussion, 1000—
Hicks & Goldmark's and Union Metallic Cartridge Co.
F. L. Waterproof, 1-10's..... 34¢35¢
E. B. Trimmed Edge, 1-10's..... 46¢48¢
E. B. Grad. Edge, Cent. Fire, 1-10's..... 46¢47¢
Musket Waterproof, 1-10's..... 50¢
G. D..... 28¢
S. B. Genuine Imported..... 45¢
Eley's E. B..... 54¢ @ 55¢
Eley's D Waterproof, Central Fire..... \$1.60

Cartridges—

Rim Fire Cartridges..... 50¢52¢
Rim Fire Military..... 15¢2¢
Cent. Fire, Pistol and Rifle..... 25¢52¢
Cent. Fire, Military and Sporting..... 15¢52¢
Blank Cartridges, except 22 and 32 cal., additional 10% on above discounts.
Blank Cartridges, 22 cal., \$1.75..... 2¢
Blank Cartridges, 32 cal., \$3.50..... 2¢
Primed Shells and Bullets..... 15¢52¢
B. B. Caps, Round Ball, \$1.75..... 2¢
B. B. Caps, Con. Ball, Swgd., \$2.00..... 2¢

Primers—

Berdan Primers, \$1.00..... 2¢
B. L. Caps (for Sturtevant Shells) \$1.00..... 2¢
All other Primers, \$1.00..... 2¢

Shells—

First quality 4, 8, 10 and 12 gauge..... 25¢10¢2¢
First quality, 14, 16 and 20 gauge (\$10 list)..... 30¢10¢2¢
Price..... 40¢2¢
Star, Club, Rival and Climax brands..... 33¢10¢2¢
Selbold's Comb. Shot Shells..... 15¢2¢
Brass Shot Shells, 1st quality..... 60¢2¢
Brass Shot Shells, Club, Rival, Climax..... 65¢2¢

Shells Loaded—

Standard List, July 19, 1890..... 40¢5¢
U. M. C. & W. R. A.—B. E., 11 up..... 68¢
U. M. C. & W. R. A.—B. E., 9&10..... 82¢
U. M. C. & W. R. A.—B. E., 8..... 96¢
U. M. C. & W. R. A.—B. E., 7..... \$1.10
U. M. C. & W. R. A.—P. E., 11 up..... 1.15
U. M. C. & W. R. A.—P. E., 9&10..... 1.50
U. M. C. & W. R. A.—P. E., 8..... 1.70
U. M. C. & W. R. A.—P. E., 7..... 1.80
Eley's B. E., 11 up..... \$1.75
Eley's P. E., 11 up..... 2.80

Anvils.—

Eagle Anvils, \$ 10¢..... 15¢15¢5¢
Peter Wright's..... 11¢@12¢
Armstrong's Mouse Hole..... 10¢@11¢
Armstrong's Mouse Hole, Extra..... 12¢12¢
Trenton..... 10¢@11¢
Wilkinson's..... 10¢@11¢
Moore & Barnes Mfg. Co..... 39¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20¢
Cheney Anvil and Vise..... 25¢
Allen Anvil and Vise, \$3.00..... 40¢10¢
Star..... 45¢5¢

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Douglas Mfg. Co..... 70¢10¢
Wm. A. Ives & Co..... 70¢10¢
Humphreysville Mfg. Co..... 70¢10¢
French, Swift & Co. (F. H. Beecher)..... 70¢10¢
Rockford Bit Company..... 70¢10¢
Cook's, Douglas Mfg. Co..... 55¢
Cook's, N. H. Copper Co. 50¢10¢50¢10¢5¢
Ives' Circular Lip..... 60¢
Patent Solid Head..... 30¢
C. E. Jennings & Co., No. 10, extension..... 40¢
C. E. Jennings & Co., No. 30..... 60¢
C. E. Jennings & Co., Auger Bits, set, 32¢ quarters, No. 5, 45¢; No. 30, \$3.50, 20¢
Lewis' Patent Single Twist..... 45¢
Russell Jennings' Augers and Bits..... 25¢10¢
Imitation Jennings' Bits..... 60¢60¢5¢
Snell's Jennings Pattern..... 30¢
Pugh's Black..... 20¢
Rockford, Jennings' Pattern..... 60¢
Car Bits..... 60¢60¢10¢
Car Bits, F. S. & W. Co..... 60¢10¢
Snell's Car Bits..... 60¢
L. Hommedieu Car Bits..... 15¢10¢
Forstner Pat. Auger Bits..... 20¢
Cincinnati Bell-Hangers' Bits..... 30¢10¢
Bit Stock Drills—
Standard..... 50¢10¢5¢
Cleveland..... 50¢10¢5¢
Syracuse, for metal..... 50¢10¢
Syracuse, for wood (wood list)..... 30¢30¢5¢
Williams' or Holt's, for metal..... 50¢10¢10¢
Williams' or Holt's, for wood..... 40¢10¢
Cincinnati, for wood..... 30¢10¢
Cincinnati, for metal..... 45¢10¢
Expansive Bits—
Clarke's small, \$18; large, \$26..... 35¢35¢5¢
Ives' No. 4, \$18; large, \$26..... 40¢
Swann's..... 40¢
Stearns' No. 1, \$26; No. 2, \$22..... 35¢
Stearns' No. 2, \$48..... 20¢
Gimlet Bits—
Common..... \$ gross \$2.75 @ \$3.25
Diamond..... \$ doz \$1.10..... 25¢10¢
See..... 25¢25¢10¢
Double Cut, Shephardson's..... 45¢4¢10¢

Double Cut, Ct. Valley Mfg. Co..... 30¢10¢
Double Cut, Hartwell's, \$ gro..... \$5.25
Double Cut, Douglass..... 40¢10¢
Double Cut, Ives..... 60¢60¢10¢

Hollow Augers—

Ives..... 33¢
French, Swift & Co..... 33¢@10¢
Douglass..... 33¢@10¢
Bonney's Adjustable, \$ doz \$48..... 40¢10¢
Stearns'..... 20¢10¢
Ives' Expansive, each \$4.50..... 50¢5¢
Wood's..... 25¢25¢10¢
Cincinnati Adjustable..... 25¢10¢
Cincinnati Standard..... 25¢10¢
Ship Augers and Bits—
L. Hommedieu's..... 15¢10¢15¢10¢5¢
Watrous..... 15¢10¢15¢10¢10¢
Snell's..... 15¢10¢15¢10¢10¢
Snell's Ship Auger Pat'n Car Bits..... 15¢10¢15¢10¢5¢

Awl Hafts—See Hafts, Awl.

Awls, Brad Sets, &c—
Awls, Sewing, Common \$ gr \$1.70, 35¢
Awls, Should. Peg, \$ gr \$2.45, 40¢40¢10¢
Awls, Pat. Peg, \$ gr 65¢..... 40¢40¢10¢
Awls, Shouldered Brad, \$ gr..... 35¢
Awls, Handled Brs..... \$7.50 \$ gr..... 45¢
Awls, Handled Scratch \$ gr, \$7.50, 35¢10¢
Awls, Socket Scratch, \$ doz, \$1.50, 25¢30¢

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First quality..... Plain, Beveled..... \$5.00 \$5.50
Others..... 7.50 8.00

Axle Grease—See Grease, Axle.

Axles—

No. 1, 4¢@5¢, No. 2, 5¢@6¢
Nos. 7 to 14..... 55¢5¢
Nos. 15 to 18..... 47¢5¢
Nos. 19 to 22..... 70¢
Concord Axles, loose collar..... 5¢@6¢
Concord Axles, solid collar..... 6¢@7¢
National Tubular Self-Oiling..... 33¢@33¢25¢

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... 40¢
No. 2000 20 30
Chatillon, \$ doz..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40¢
Chatillon Circular Balances..... 50¢10¢

Bars.

Croze—
Cast Steel..... \$ 4¢
Iron, Steel Points..... \$ 3¢

Basins, Wash—

Standard Fiberware, No. 1, 10½-inch, \$2; 12-inch, \$2.25; 13½-inch, \$2.75; 15-inch, \$3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '82..... 50¢10¢
Chatillon's No. 1..... 40¢
Chatillon's No. 2..... 50¢
Custer's..... 33¢

Benders—

Dover..... \$ doz \$1.50
Duplex (Standard Co.)..... \$ doz \$1.25
Rival (Standard Co.)..... \$ doz \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ doz \$3.50

Bryant's..... \$ doz \$3.50
Double (H. & R. Mfg. Co.), \$ gro. No. 0, \$12.00; No. 1, \$15.00; No. 2..... \$36.00
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00
Triple (H. & R. Mfg. Co.)..... \$ gro \$15.00
Spiral (H. & R. Mfg. Co.)..... \$ gro \$4.50
Improved Acme (H. & R. Mfg. Co.)..... \$ gro \$9.00

Paine, Diehl & Co.'s..... \$ gro \$24.00
Silver & Co..... \$ doz \$5.50

Keystone, P. D. & C., Each, No. 1, \$1; No. 2, \$2..... 20¢

Bells—

Common Wrought..... 60¢10¢
Western..... 20¢10¢
Kentucky, "Star"..... 20¢10¢
Kentucky, Sargent's list..... 70¢10¢
Dodge, Genuine Kentucky..... 70¢70¢10¢
Texas Star..... 50¢10¢50¢10¢5¢
Farm Bells..... 40¢40¢5¢
Steel Alloy Church and School Bells..... 40¢

Door—

Gong, Abbe's..... 33¢4¢10¢
Gong, Yankee..... 45¢10¢
Gong, Barton's..... 40¢10¢50¢
Crane, Taylor's..... 25¢10¢
Crane, Brooks'..... 50¢10¢25¢
Crane, Cone's..... 10¢
Crane, Connell's..... 20¢10¢
Lever, Sargent's..... 60¢10¢
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25¢10¢
Lever, R. E. M. Co.'s..... 50¢10¢25¢
Pull, Brook's..... 50¢10¢25¢
Pull, Western..... 25¢10¢
Electric,
Wollensak's..... 20¢
Bigelow & Dowse..... 20¢
Taylor's..... 20¢
Hand—
Light Brass..... 75¢10¢
Extra Heavy..... 65¢10¢
White Metal..... 60¢10¢10¢
Silver Chime..... 33¢4¢10¢
Globe Cone's Patent..... 25¢10¢35¢

Bellows—

Blacksmith's..... 60¢25¢65¢
Molders..... 40¢40¢10¢
Hand Bellows..... 40¢10¢50¢

Belting, Rubber—

Common Standard..... 70¢70¢5¢
Standard..... 60¢10¢10¢70¢
Extra..... 50¢10¢60¢
N. Y. B. & P. Co., Carbon..... 50¢5¢50¢10¢5¢
N. Y. B. & P. Co., Diamond..... 40¢5¢40¢10¢

Bench Stops—See Stops, Bench.

Benders, Upsetters, Tire.
Stoddard's Lightning Tire Upsetters..... 15¢
Detroit Perfected Tire Bender..... 15¢

Bits—

Anger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.
Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.
Blind Fasteners—See Fasteners, Blind.
Blind Staples—See Staples, Blind.

Blocks—

Ordinary Tackle, list May 20, 1889..... 60¢10¢10¢70¢
Cleveland Block Co., Mal. Iron..... 30¢
Moore's Novelty, Mal. Iron..... 50¢

Boards, Stove.

Wood Lined "Crystal"..... 50¢
"Embossed"..... 50¢
"Oxidized"..... 55¢
Paper Lined Zinc..... 45¢
"Crystal"..... 55¢
"Embossed"..... 55¢
"Oxidized"..... 45¢

Bolts—

Carriage, Machine, &c.—
Com. list June 10, '84..... 70¢10¢5¢2¢
Genuine Eagle, list Oct., '84..... 75¢10¢80¢
Phila. pattern, list Oct. 7, '84..... 80¢80¢10¢
R. H. & W., old list..... 70¢
Machine, list Jan. 1, 1890..... 75¢10¢75¢10¢5¢
Bolt Ends, list Jan. 1, 1890..... 75¢10¢75¢10¢5¢

Door and Shutters—

Cast Iron Barrel, Square, &c., 70¢70¢10¢
Cast Iron Shutter Bolts..... 70¢70¢10¢
Cast Iron Chain (Sargent's list)..... 65¢10¢
Ives' Patent Door Bolts..... 60¢
Wrought Barrel..... 70¢70¢10¢
Wrought Square..... 70¢70¢10¢
Wt. Shutter, all Iron, Stanley's..... 40¢10¢
Wt. Shutter, Brass Knob..... 40¢10¢
Wt. Shutter, Sargent's list..... 60¢10¢
Wt. Sunk Flush, Sargent's list..... 55¢10¢
Wt. Sunk Flush, Stanley's list..... 50¢10¢
Wt. B. K. Flush, Com'n..... 55¢10¢
Stove and Plow—
Stove..... 60¢
Plow..... 60¢5¢
R. B. & W. Plow..... 55¢

Tire—

Common, list Feb. 28, '83..... 65¢
Port Chester Bolt and Nut Company:
Empire, list Feb. 28, '83..... 65¢
Keystone, Philad., list Oct. '84..... 80¢
Norway, Phila., list Oct. '84..... 75¢
American Screw Company:
Norway, Phil., list Oct. 16, '84..... 75¢
Eagle, Phil., list Oct. 16, '84..... 80¢
Philad., list Oct. 16, '84..... 80¢
Ray State, list Feb. 28, '83..... 65¢
R. B. & W. Philad., list Oct. 16, '84..... 80¢

Borers, Tap.

Common and Kind..... 20¢10¢
Ives' Tap Borers..... 33¢4¢5¢
Enterprise Mfg. Co..... 20¢10¢30¢
Clark's..... 33¢33¢
Borax..... \$ 9¢10¢4¢

Boring Machines—See Machines, Boring.
Bow Pins—See Pins, Bow.
Boxes, Wagon.
Per..... 3¢

Braces.

American Bit Brace Co.:
Nos. 10, 12, 20..... 60¢10¢
Nos. 11, 21, 24, 27..... 70¢10¢
Nos. 22, 23, 25..... 60¢10¢5¢
Nos. 13, 26, 36, 37..... 70¢10¢5¢
Ball Braces, net..... \$1.12 to \$1.25

Amidons.

Barker's Imp'd Plain..... 75¢10¢80¢
Barker's Imp. Nickle..... 65¢10¢70¢
Ratchet..... 75¢10¢80¢
Eclipse Ratchet..... 60¢
Globe Jawed..... 40¢40¢10¢
Corner Brace..... 40¢40¢10¢
Universal, 8 in. \$2.40 10 in. \$2.25
Buffalo Ball..... \$1.10 to \$1.15

Barber's.

Nos. 10 to 16..... 50¢
Nos. 30 to 33..... 50¢
Nos. 40 to 63..... 50¢10¢
Saxton's..... 50¢

Barker's Imp. Polished..... 75¢10¢80¢
Barker's Imp. Nickle..... 65¢10¢70¢
Ratchet, Polished..... 50¢10¢80¢
Ratchet, Nickle..... 40¢10¢50¢
Buffalo Ball..... net, \$1.10 to \$1.15

Bartholomew's.

Nos. 25, 27 and 30..... 60¢10¢80¢5¢
Nos. 117, 118, 119..... 70¢70¢5¢
Common Ball, American..... \$1.00 to \$1.10
Fray's Genuine Spofford's..... 50¢5¢50¢10¢
Fray's No. 70 to 120, 81 to 123, 207 to 414..... 50¢10¢

Ives' New Haven Novelty..... 70¢70¢5¢
New Haven Ratchet..... 60¢25¢60¢10¢
Barber Ratchet..... 60¢25¢60¢10¢
Barbers..... 60¢5¢
Spofford..... 60¢25¢60¢10¢
Oswood's Ratchet..... 40¢10¢50¢
F. S. & W. Co., Peck's Patent..... 50¢

Brackets.

Shelf plain, Sargent list, 55¢10¢55¢
Shelf, fancy, Sargent's list, 60¢10¢60¢
Reading, plain..... 50¢10¢60¢10¢5¢
Reading, Rosette..... 60¢10¢60¢10¢10¢

Bright Wire Goods—See Wire.

Broilers.

Hens' Self-Inch..... 9 10 9x11
Basting..... \$ Per doz \$4.50 5.50 6.50
New Haven..... 50¢

Buckets, Well.

Galvanized—

Hill's..... \$ doz 12 qt, \$4.25; 14 qt, \$5.25
Iron Clad..... \$ doz 14 qt, \$4.25 @ \$4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ doz \$4.00

Bull Rings—See Rings, Bull.

Butchers' Cleavers—See Cleavers

Butchers'.

Butts—

Brass—
Wrought Brass..... 75¢10¢80¢
Cast Brass, Tinsmith's..... 50¢
Cast Brass, Corbin's, Fast..... 33¢4¢10¢
Cast Brass, Loose Joint..... 33¢4¢10¢

Cast Iron—

Fast Joint, Narrow..... 50¢10¢5¢60¢
Fast Joint, Broad..... 50¢10¢60¢
Loose Joint..... 50¢
Loose Joint, Japanned..... 50¢
Loose Joint, Jap. with Acorns..... 70¢10¢
Mayer's Hinges..... 70¢10¢
Loose Pin, Acorns..... 70¢10¢
Loose Pin, Acorns, Japanned..... 70¢10¢
Loose Pin, Acorns, Japanned, Plated Tips..... 70¢10¢

Wrought Steel—

Fast Joint, Narrow..... 50¢10¢5¢60¢
Fast Joint, Broad..... 50¢10¢60¢
Loose Joint..... 50¢
Loose Joint, Broad..... 70¢10¢
Table Butts, Back Flaps, &c..... 70¢10¢
Inside Blind, Regular..... 70¢10¢
Inside Blind, Light..... 70¢10¢
Loose Pin..... 50¢
Brazed Wrought Butts..... 50¢

Calipers—See Compasses.

Calks, Toe—

Gantler, One Prong, Blunt..... 5¢@6¢
Burke's, One Prong, Blunt..... 5¢@6¢
Burke's, Two Prong, Blunt..... 7¢@8¢
Burke's, One Prong, Sharp..... 6¢@7¢

Can Openers—See Openers, Can.

Cards—

Horse & Curry..... 10¢10¢10¢10¢
Cotton..... 10¢10¢10¢10¢
Wool..... 10¢10¢10¢10¢

Carpet Stretchers—See Stretchers

Carpet.

Carpet Sweepers—See Sweepers
Carpet.

Cartridges—See Ammunition.

Casters—

Bed..... { Brass..... 55¢55¢10¢
Plate..... { Others..... 60¢60¢10¢
Shallow Socket..... 40¢10¢
Deep Socket..... 40¢10¢
Yale Casters, list May, 1884..... 80¢10¢40¢
Yale, Germ..... 80¢60¢5¢
Martin's Patent (Phoenix)..... 45¢10¢50¢
Payson's Anti-Friction..... 60¢60¢10¢
Giant Truck Casters..... 30¢
Stationary Truck Casters..... 60¢10¢
Socket Truck Casters..... 60¢

Cattle Leaders—See Leaders, Cattle.
Cement.
Victor Elastic..... 5 lb pails \$ 5¢

Chain—

Trace, Wagon and Fancy Chains.
List revised April 21, 1890..... 50¢
American Coil, in cask lots,
3-16 ¼ 5-16 ¼ 7-16 ¼ 5¢ 3¢
\$7.75 \$4.5 4.55 4.00 3.65 2.50 3.40 3.30
Less than cask lots, add ¼¢@½¢
German Coil, list Oct. 6, 1890..... 50¢10¢5¢60¢
German Halter Chain, list Oct. 6, 1890..... 50¢10¢5¢60¢
Covert Halter..... 60¢25¢
Covert Traces..... 35¢25¢
Covert Heel Chain..... 50¢25¢
Onelda Halter Chain..... 60¢60¢5¢
Galvanized Pump Chain..... \$ 5¢10¢6¢
Jack Chain, Iron..... 75¢10¢80¢
Jack Chain, Brass..... 75¢75¢10¢

Chalk—

White..... \$ gr 50¢
Red..... \$ gr 70¢
Blue..... \$ gr 85¢
See also Crayons.

Chalk Lines—See Lines.
Chisels—
Socket Framing and Firmer.
P. S. & W..... 75¢75¢10¢
New Haven..... 75¢75¢10¢
Wetherby..... 75¢75¢10¢
Mix..... 75¢75¢10¢
Ohio Tool Co..... 75¢75¢10¢
Douglas..... 75¢75¢10¢
Buck Bros..... 30¢
Merrill..... 60¢10¢60¢10¢5¢
L. & J. White..... 30¢30¢27¢

Tanged and Miscellaneous..... 40¢10¢50¢
Butchers'..... \$4.75 @ \$5.00
Spear & Jackson's..... \$5 to \$
Buck Bros..... 30¢
Cold Chisels..... 15¢10¢

Chucks.

Beach Pat. each, \$8.00.....	20%
Morse's Adjustable, each, \$7.00, 20@20.5%	
Danbury, each, \$6.00, 80@30.5%	
Yrcause, each, \$6.00, 33%	
Graham Patent.....	33%
Skinner's Patent Chucks.....	33%
Combination Lathe Chucks.....	33%
Universal Lathe Chucks.....	40%
Independent Lathe Chucks.....	40%
Drill Chucks.....	15%
Union Mfg. Co., Victor.....	\$8.50, 25%
Combination.....	40%
Universal.....	40%
Independent.....	40%

Churns.

Tiffin Union No. 1, 5 gallon.....	\$3.25 each
Tiffin Union No. 2, 7 gallon.....	\$3.75 each
Tiffin Union No. 3, 10 gallon.....	\$4.25 each

Clamps.

R. I. Tool Co.'s Wrought Iron.....	25%
Adjustable, Cincinnati.....	15@10%
Adjustable, Hammers.....	15%
Adjustable, Stearns.....	30@30.10%
Stearns' Adjustable Cabinet and Cor- ner.....	30@30.10%
Cabinet, Sargent's.....	60@10%
Carriage Makers', Sargent's.....	70@10%
Carriage Makers', P. S. & W. Co.....	40@10%
Eberhard Mfg. Co., 40@10%	
Warner's.....	40@10%
Saw Clamps, see Vices, Saw Filers.	
Carpenters', Cincinnati.....	25@10%

Clenvers.

Butchers', Bradley's.....	25@30%
L. & J. White.....	20@5%
Beatty's.....	40@40.5%
New Haven Edge Tool Co.....	40%
P. S. & W.....	33@35%
Foster Bros.....	30%
Schulte, Lohoff & Co.....	40@40.5%

Clips.

Norway, Axle, 1/2 & 5-16.....	55@55.5%
2nd grade Norway Axle, 1/2 & 5-16.....	66@55%
Superior Axle Clips.....	66@57%
Norway Spring Bar Clips, 5-16.....	60@55.5%
Wrought-Iron Felloe Clips.....	50@55%
Steel Felloe Clips.....	50@55%
Baker Axle Clips.....	25%

Cloth and Netting, Wire.—See Wire, &c.

Cockeyes.

Cockeyes.....	50%
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Cocks, Brass.

Hardware list.....	50@25%
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Coffee Mills.

See Mills, Coffee.

Collars, Dog, &c.

Medford Fancy Goods Co.....	40@10%
Embossed, Gift, Pope & Steven's list.....	30@10%
Leather, Pope & Steven's list.....	40%
Brass, Pope & Steven's list.....	40%
Chapman Mfg. Company.....	50@10@60%

Combs, Curry.

Fitch's.....	50@10@50@10@10%
Rubber, per doz \$10.00.....	20%
Perfect.....	50%

Compasses, Dividers, &c.

Compasses, Calipers, Dividers.....	70@70.10%
Bemis & Co.'s.....	60@5%
Dividers.....	50@5%
Compasses & Calipers.....	50@5%
Wing and Inside or Outside.....	50@5%
Double.....	60%
(Call's Pat. Inside).....	50%
Excelsior.....	50%
J. Stevens & Co.'s.....	25@10%
Starrett's Spring Calipers and Dividers.....	25@10%
Lock Calipers and Dividers.....	25%
Combination Dividers.....	25%

Coopers' Tools.

See Tools, Coopers'.

Cord.

Sash.....	
Common.....	10@11%
Patent, good quality.....	13@13.5%
White Cotton Braided, fair.....	25%
Common Russia Sash.....	13@13.5%
Patent.....	15%
Cable Laid Italian Sash.....	22@23%
Indian Cable Laid.....	13%
Silver Lake.....	10@10.5%
A Quality, White, 50.....	10@10.5%
B Quality, White, 50.....	10@10.5%
C Quality, White, 50.....	10@10.5%
Sylvan Spring, Extra Braided, White, 34.....	34%
Sylvan Spring, Extra Braided, Drab, 34.....	34%
Semper Idem, Braided, White.....	30%
Egyptian, India Hemp, Braided.....	25%
Samson.....	
Braided, White Cotton, 50.....	30@30.5%
Braided, Drab Cotton, 50.....	30@30.5%
Braided, Italian Hemp, 50.....	30@30.5%
Braided, Linen, 80.....	30@30.5%
Wire Picture.....	75@75.10%

Corkscrews.

See Screws, Cork.

Corn Knives and Cutters.

See Knives, Corn.

Crackers, Nut.

Table (H. & B. Mfg. Co.).....	40%
Blake's Pattern.....	10%
Turner & Seymour Mfg. Co.....	50%

Cradles.

Grain.....	50@52@50@10@25%
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Crayons.

White Crayons, 1/2 gr, 12@12.5%.....	10%
D. M. Stewart Mfg. Co., Metal Work- ers, 1/2 gr, 12@12.5%.....	25%
D. M. Stewart Mfg. Co., Rolling Mill, 1/2 gr, 12@12.5%.....	25%
See also Chalk.	

Crow Bars.

See Bars, Crow.

Curry Combs.

See Combs, Curry.

Curtain Pins.

See Pins, Curtain.

Cutters.

Meat.....	
Dixon's # doz.....	40@5%
Nos.....	1 2 3 4
Woodruff's # doz.....	\$14.00 \$17.00 \$19.00 \$20.00
Nos.....	100 150
Hales Pattern # doz.....	\$15.00 \$18.00
Nos.....	11 12 13
American.....	\$27.00 \$33.00 \$45.00
Nos.....	1 2 3 4 5
Each.....	\$5 \$7 \$10 \$25 \$50 \$60
Enterprise.....	30%
Nos.....	10 12 22 32 42
Each.....	\$3 \$2.50 \$4 \$6 \$15
Great American Meat Cutter.....	30%
Nos.....	112 116 118 120 122
Each.....	\$2.00 \$2.75 \$3.00 \$2.50 \$4.00
Miles' Challenge # doz.....	45@45.10%
Nos.....	1 2 3
Home No. 1.....	\$22.00 \$30.00 \$40.00
Draw Cut, each.....	\$50 \$75 \$80 \$225
Nos.....	5 2 6 8
Great American.....	30%
Beef Shavers (Enterprise).....	30@10@30%
Little Giant.....	50%
Chadborn's Smoked Beef Cutter.....	\$60.00

Tobacco.

Champion.....	20@10@30%
Wood Bottom.....	\$5.00 \$5.25
All Iron.....	\$4.25
Nashua Lock Co.'s.....	\$18.00 50@55%
Wilson's.....	55%
Sargent's.....	\$24, 55@10%
Acme.....	\$20.00, 40%

Washer.

Smith's Pat.....	\$12.00, 20@10@10%
Johnson's.....	\$11.00, 33@%
Penney's # doz Pol. \$14; Jap'd.....	\$16.00, 55%
Appleton's.....	\$16.00, 60@10%
Bonney's.....	30@10%
Cincinnati.....	25@10%

Cutlery.

Pocket and Table.....	Net prices
Wostenholm.....	New list in preparation

Dampers, &c.

Dampers, Buffalo.....	40@10%
Buffalo Damper Clips.....	40@10%
Crown Damper.....	40%
Excelsior.....	40@10%

Diggers, Post Hole, &c.

Samson Post Hole Digger, # doz.....	\$36.00, 25%
Fletcher Post Hole Augers, # doz.....	\$36, 20%
Eureka Diggers.....	\$12.50@14.00
Lyons'.....	\$8.00@9.00
Vaughan's Post Hole Auger, # doz.....	\$13.00@14.00
Kohler's Little Giant.....	\$12, 18%
Kohler's Hercules.....	\$12, 15%
Kohler's New Champion.....	\$9, 10%
Schneider.....	\$18, 10%
Ryan's Post Hole Digger, # doz.....	\$24, 60%
Cronk's Post Bars, # doz.....	\$60.00, 50%
Gibbs Post Hole Digger, # doz.....	\$30.00, 50%
Imperial, # doz.....	\$15, 45%

Dividers.

See Compasses.

Dog Collars.

See Collars, Dog, &c.

Door Springs.

See Springs, Door.

Drawers.

Money, # doz.....	\$18@20
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Drawing Knives.

See Knives, Drawing.

Drills and Drill Stocks.

Blacksmiths'.....	each \$1.75
Blacksmiths' Self-Feeding, each.....	\$7.50, 20%
Breast, P. S. & W.....	40@10%
Breast, Wilson's.....	30@5%
Breast, Millers Falls.....	each \$3.00, 25%
Breast, Bartholomew's.....	each \$2.50, 25%
Ratchet, Merrill's.....	20@20.5%
Ratchet, Ingersoll's.....	25%
Ratchet, Parker's.....	20@20.5%
Ratchet, Whitney's.....	20@20.5%
Ratchet, Weston's.....	20@25%
Ratchet, Moore's Triple Action.....	25@30%
Ratchet, Curtis & Curtis.....	30%
Whitney's Hand Drill, Plain.....	\$11.00, 30%
Adjustable.....	\$12.00, 30@10%
Wilson's Drill Stocks.....	10%
Automatic Boring Tools.....	\$1.75@1.85

Twist Drills.

Morse.....	50@10@5%
Standard.....	60@10@5%
Syracuse (Metal list).....	50@10%
Cleveland.....	50@10@5%
Williams.....	50@10@5%
New Process.....	50@10@5%
Graham's Patent Groove Shank.....	50@10@5%

Drill Bits.

See Augers and Bits.

Drill Chucks.

See Chucks.

Dripping Pans.

See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....	20@20.10%
Diston's.....	20%
Buck Bros.....	30%
Stanley R. & L. Co.'s Varnished Handles.....	65@10%
Black Handles.....	60@10%
Sargent & Co.'s No. 1 Forged Blade.....	60@10@10%
Nos. 2, 30 and 60.....	60@10@10%
P. S. & W.....	70%
Knapp & Cowles: No. 1.....	60@20@70%
No. 2.....	60@10@70%
No. 3.....	60@5@70%
Nos. 4 and 00, Acme and Ideal.....	50%
Stearns'.....	25@10@5%
Gay & Parsons.....	35%
Champion.....	25@10%
Clay's Pat.....	30@33@%
Crawford's Adjustable.....	25@10%
Ellich's Socket and Ratchet.....	25@10%
Allard's Spiral, new list.....	25%
Kob's Common Sense # doz.....	\$6.00, 25@10%
Syracuse Screw-Drivers.....	30@30.5%
Screw-Drivers Bits.....	# doz, 50@75%

Screw-Drivers Bits, Parr's.....	# gro \$6.25
Fray's Hol. Hdle. Sets, No. 3.....	\$12.00, 25@25.10%
P. D. & Co.'s all Steel.....	50%
Cincinnati.....	25@10%
Brace Screw Drivers.....	25@10%
Buck Bros' Screw-Drivers Bits.....	25@10%

Egg Beaters.

See Beaters, Egg.

Egg Poachers.

See Poachers, Egg.

Electric Bell Sets.

See Bells, Elec-
tric.

Emery.

No. 4 to No. 54 to Flour, CF 40 gr. 150 gr. F. FF.	
Kegs, # m.....	4%
1/2 kegs, # m.....	5%
3/4 kegs, # m.....	5 1/2%
10-lb cans, 10.....	6%
10-lb cans, less than 10.....	10% 10% 7 1/2%

Enameled and Tinned Ware.

See Ware, Hollow.

Escutcheon Pins.

See Pins, Es-
cutcheon.

Escutcheons.

Door Lock..... Same dis as Door Locks.

Expanded Metal.

List No. 5.	
Lathing.....	10%
Fencing, Painted Sheets.....	20%
Netting, Painted Sheets.....	20%
Door Mats, Galvanized.....	25%
Window Guards, Paneled.....	15%
Tree Guards, Paneled.....	15%

Fasteners, Blind.

Mackrell's, # doz.....	\$1.00, 20@20.10%
Van Sand's Screw Pat., \$15 # gr.....	60@10%
Van Sand's Old Pat., \$15.00 # gr.....	55@10%
Washburn's Old Pattern, # gr.....	\$2.00
Merriman's.....	New list
Austin & Eddy No. 2008 # gr.....	\$9.00
Security Gravity, # gr.....	\$9.00

Faucets.

Fenn's.....	40%
Bohren's Pat. Rubber Ball.....	25%
Fenn's Cork Stops.....	33@%
Star.....	60%
Frary's Pat. Petroleum.....	40@52%
B. & L. B. Co. West's Lock, Open and Shut Key.....	50%
Star, Metal Plug, new list.....	40%
Lockport, Metal Plug, reduced list.....	60%
Metallic Key, Leather Lined.....	60@10%
Cork Lined.....	70@5@70@10%
Burnside's Red Cedar.....	50%
Burnside's Red Cedar, bbl lots.....	50@10%
John Sommers' Perless Best Block Tin Key.....	40%
LX, 1st quality, Cork Lined.....	50%
Diamond Lock.....	50%
Perfection, Fla. Red Cedar.....	50%
Goodenough Cedar.....	50%
Ross Metallic Key.....	50%
Reliable Cork Lined.....	60%
Western Pattern Cork Lined.....	50%
Self-Measuring.....	50%
Enterprise, # doz.....	\$50.00, 20@10%
Lane's, # doz.....	\$36.00, 25@10%
Victor, # doz.....	\$36.00, 25@10%

Felloe Plates.

See Plates, Felloe.

Fifth Wheels.

Derby and Cincinnati.....	45@5%
Brewster.....	50@5%

Files.

Domestic.....	
Nicholson Files, Rasps, &c.....	60@10@60@10@5%
Nicholson (X. F.) Files.....	25%
Nicholson's Royal Files (Seconda).....	75%
(extra prices on certain sizes)	
Other makers, best brands.....	60@10@60@20%
Fair brands.....	60@10@60@5%
Second quality.....	70@10@75@10%
Nicholson's Horse Rasps.....	60@10@60%

Heller's Horse Rasps.

McCaffrey's Horse Rasps.....	50@10%
Chelsea Horse Rasps, Hand Cut.....	50@10%
Imported.....	
Moss & Gamble.....	List, April 1, 1883, 15%
Butcher.....	Butcher's list, 20%
Stubs.....	Stubs list, 25@30%
Turton's.....	Turton's list, 20@25%
Greaves' Horse Rasps, American list.....	60%

Fixtures.

Grindstone.....	
Sargent's Patent.....	70@10%
Reading Hardware Co.....	30@10%
P. S. & W. Co.....	50@10%

Fluting Machines.

See Machines, Fluting.

Fluting Scissors.

See Scissors, Fluting.

Fodder Squeezers.

See Squeezers, Fodder.

Forks.

Roggin's Latches..... 30¢ doz 30¢ doz 35¢
 Bronze Iron Drop Latches..... 70¢ doz 70¢ net
 Jap'd Store Door Handles—Nuts, 1.62;
 Plate, \$1.10; no Plate, \$0.88 net
 Barn Door, 10¢ doz 1.40 10¢ doz
 Chest and Lifting..... 70¢

Wood—

Saw and Plane..... 40¢ 10¢ 40¢ 10¢ 5¢
 Hammer, Hatchet, Axe, Sledge, &c..... 40¢
 Brad Awl..... 20¢ gr 2.00
 Hickory Firmer Chisel, ass'd..... 40¢ gr 4.50
 Hickory Firmer Chisel, large..... 50¢ gr 5.00
 Apple Firmer Chisel, large..... 60¢ gr 6.00
 Socket Firmer Chisel, ass'd..... 30¢ gr 3.00
 Socket Framing Chisel, ass'd..... 50¢ gr 5.00
 J. S. Smith & Co.'s Pat File..... 50¢
 File, assorted..... 20¢ gr 2.75
 Auger, large..... 30¢ gr 7.00
 Auger, assorted..... 20¢ gr 5.00
 Pat. Auger, Ives..... 30¢ 10¢
 Pat. Auger, Douglass..... 20¢ set \$1.25
 Pat. Auger, Swan's..... 20¢ set \$1.00
 Hoe, Rake, Shovel, &c..... 50¢ 10¢

Hangers—

Barn Door, old patterns..... 60¢ 10¢ 10¢ 70¢
 Barn Door, New England..... 60¢ 10¢ 10¢ 70¢
 Samson Steel Anti-Friction..... 55¢
 Orleans Steel..... 55¢
 Hamilton Wrought Wood Track..... 55¢
 U. S. Wood Track..... 55¢
 Champion..... 60¢ 10¢
 Rider and Wooster, Medina Mfg. Co.'s..... 70¢
 List..... 70¢
 Climax Anti-Friction..... 55¢
 Climax Anti-Friction for Wood Track..... 55¢
 Zenith for Wood Track..... 55¢
 Reed's Steel Arm..... 50¢
 Challenge, Barn Door..... 50¢
 Sterling's Improved Anti-Friction..... 50¢
 Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00..... 50¢ 25¢
 Cheritree..... 50¢ 10¢
 Kiddy..... 50¢ 10¢ 20¢
 The Boss..... 60¢ 10¢
 Best Anti-Friction..... 60¢ 10¢
 Duplex (Wood Track)..... 60¢ 10¢ 5¢
 Terry's Pat., 5 doz pr. 4 in., \$10.00; 5 in., \$12.00..... 60¢ 10¢
 Terry's Steel Anti-Friction Leader..... 50¢ 10¢
 Terry's Steel Anti-Friction Ideal..... 50¢ 10¢
 Cronk's Patent, Steel Covered..... 50¢ 5¢
 Wood Track Iron Clad, 5 ft., 10 ft., &c..... 15¢ 60¢
 Carrier Steel Anti-Friction..... 50¢ 10¢
 Architect, 5 set \$6.00..... 20¢
 Eclipse..... 20¢ 10¢
 Felix, 5 set \$4.50..... 20¢
 Richards..... 20¢ 10¢ 10¢
 Lane's Standard..... 50¢ 5¢ 50¢ 10¢
 Lane's New Standard..... 50¢ 5¢ 5¢
 Ball Bearing Door Hanger, 20¢ 10¢ 25¢ 10¢
 Warner's Pat..... 20¢ 10¢ 20¢ 10¢ 10¢
 Stearns' Anti-Friction, 20¢ 10¢ 20¢ 10¢ 10¢
 Stearns' Challenge..... 25¢ 10¢ 25¢ 10¢ 10¢
 Faultless..... 40¢ 10¢ 40¢ 10¢
 American, 5 set \$6.00..... 20¢ 10¢
 Rider & Wooster, No. 1, 62½¢; No. 2, 75¢..... 40¢
 Paragon, Nos. 1, 2 and 3..... 40¢ 10¢
 Cincinnati..... 25¢ 10¢
 Paragon, Nos. 5, 5¼, 7 and 8..... 20¢ 10¢
 Crescent..... 60¢ 60¢ 10¢
 Nickel Cast Iron..... 50¢
 Nickel, Malleable Iron and Steel..... 40¢
 Scranton Anti-Friction Single Strap..... 35¢
 Wild West, 4 in. Wheel, \$15.00; 5 in. \$21.00..... 45¢
 Star..... 40¢ 10¢ 50¢ 50¢ 10¢
 May..... 50¢ 50¢ 50¢ 10¢
 Rarv..... 40¢ 10¢
 Interstate..... 50¢
 Magic..... 45¢

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.
 Blood's..... 40¢ 10¢
 Hunt's..... 40¢ 10¢
 Hurd's..... 40¢ 10¢
 Mann's..... 40¢ 10¢
 Peck's..... 40¢ 10¢
 Underhill's..... 40¢ 10¢
 Buffalo Hammer Co..... 40¢ 10¢
 Fayette R. Plumb..... 50¢ 5¢
 C. Hammond & Son..... 50¢ 5¢
 Kelly's..... 50¢ 5¢
 Sargent & Co..... 50¢ 5¢
 P. S. & W. Co..... 50¢ 5¢
 Ten Eyck Edge Tool Co..... 50¢ 5¢
 Collins..... 10¢
 Schulte, Lohoff & Co..... 50¢ 50¢ 5¢

Hay and Straw Knives—See

Knives—

Blind Hinges—

Parker..... 75¢ 25¢
 Palmer..... 50¢ 5¢ 10¢
 Seymour..... 70¢ 25¢
 Huffer..... 50¢
 Clark's, Nos. 1, 3, 5, 40 and 50..... 75¢ 10¢ 5¢ 20¢
 Clark's Mortise Gravity..... 75¢ 10¢ 5¢ 20¢
 Sargent's, Nos. 1, 3, 5, 11, 13..... 75¢ 10¢ 5¢ 20¢
 Sargent's, No. 12..... 77¢ 10¢ 10¢
 Reading's Gravity..... 75¢ 10¢ 75¢ 10¢ 5¢
 Shepard's..... 75¢ 10¢
 Noiseless..... 75¢ 10¢
 Buffalo..... 80¢
 Clark's Genuine Pattern..... 75¢ 10¢
 O. S. Lull & Porter..... 75¢ 10¢
 Acme, Lull & Porter..... 75¢ 10¢
 Queen City Reversible..... 70¢ 10¢ 5¢ 75¢
 Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3..... 75¢ 10¢ 25¢
 North's Automatic Blind Hinges, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50..... 10¢

Gate Hinges—

Western..... 50¢ doz \$4.40, 60¢
 N. E. Reversible..... 50¢ doz \$5.20, 55¢ 10¢
 Clark's, Nos. 1, 2, 3..... 60¢ 10¢ 5¢
 V. Y. State..... 50¢ doz \$5.00, 55¢ 10¢
 Automatic..... 50¢ doz \$13.50, 50¢
 Common Sense..... 50¢ doz pair \$4.50, 50¢
 Seymour's..... 45¢ 10¢
 Shepard's..... 40¢ 10¢ 5¢
 Reed's Latch and Hinges..... 50¢ doz \$12.00, 50¢

Spring Hinges—

Union Spring and Blank Butte..... 40¢
 Near's Spring Hinge Co.'s list, March 1886..... 20¢

Acme..... 30¢
 J. S..... 25¢ 10¢
 Empire and Crown..... 20¢
 Hero and Monarch..... 55¢
 American, Gem, and Star..... 20¢
 Oxford..... 20¢
 Barker's Double Acting..... 25¢
 Union Mfg. Co..... 25¢
 Bommer's..... 30¢
 Suckman's..... 15¢ 20¢
 Chicago..... 30¢
 Wiles..... 10¢
 Dewore's..... 40¢
 Rex..... 40¢
 Royal..... 60¢
 Reliable..... 60¢
 Champion..... 60¢
 Bardsley's Patent..... 40¢
 Stearns..... 50¢ 10¢
 Niagara, Holdback pattern, per gross..... \$14.00

Wrought Iron Hinges

Strap and T..... 75¢ 10¢
 Screw Hook and Strap..... 14 to 20 in., 10¢ 3-7-10¢
 Heavy Welded..... 6 to 12 in., 10¢ 3-7-10¢
 Hook..... 14 to 20 in., 10¢ 3-7-10¢
 Screw Hook..... ¼ in., 10¢ doz \$1.50
 and Eye..... ¼ in., 10¢ doz \$2.45, 10¢
 Rolled Blind Hinges, Nos. 32 and 34..... 50¢ 10¢
 Rolled Blind Hinges, Nos. 232 and 234..... 55¢ 10¢
 Rolled Plate..... 70¢ 10¢
 Rolled Raised..... 70¢ 10¢
 Plate Hinges 8, 10 & 12 in., 10¢ 5¢
 "Providence" over 12 in., 10¢ 4¢

Hoes—

Eye—
 D. & H. Scovill..... 20¢
 Lane's Crescent Planter Pattern..... 45¢ 5¢
 Lane's Razor Blade, Scovill Pattern..... 30¢
 Maynard, S. & O. Pat..... 45¢ 5¢
 Sandusky Tool Co., S. & O. Pat..... 50¢ 10¢ 5¢
 Am. Axe and Tool Co., S. & O. Pat..... 40¢
 Chattanooga Tool Co., S. & O. Pat..... 60¢
 Grub..... 50¢ 10¢

Handled—

Garden, Mortar, &c..... 65¢ 5¢ 65¢ 10¢
 Planter's, Cotton &c..... 65¢ 5¢ 65¢ 10¢
 Warren Hoe..... 60¢
 Magic..... 50¢ doz \$4.00

Hog Rings and Ringers—See

Rings and Ringers.

Hoisting Apparatus—See Ma-

chines, Hoisting.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag—
 Sprengle's Pat..... 50¢ doz \$18..... 60¢
 Bit—
 Extension..... 40¢ 10¢
 Barber's 5 doz \$15.00..... 40¢ 40¢ 10¢
 Ives, 5 doz \$20.00..... 60¢ 50¢ 60¢ 10¢
 Diagonal..... 50¢ doz \$24.00, 40¢
 Angular..... 50¢ doz \$24.00, 40¢ 5¢
 File and Tool—
 Bals Pat..... 50¢ doz \$4.00, 25¢
 Nicholson File Holders..... 20¢
 Dick's Tool Holder..... 20¢

Hooks—

Cast Iron—
 Bird Cage, Sargent's list..... 60¢ 10¢ 10¢
 Bird Cage, Reading..... 60¢ 10¢ 10¢
 Clothes Line, Sargent's list..... 60¢ 10¢ 10¢
 Clothes Line, Reading list..... 60¢ 10¢ 10¢
 Ceiling Sargent's list..... 55¢ 10¢ 55¢ 10¢ 10¢
 Harness, Reading list..... 55¢ 10¢ 55¢ 10¢ 10¢
 Coat and Hat, Sargent's list..... 55¢ 10¢ 55¢ 10¢ 10¢
 Coat and Hat, Reading..... 55¢ 10¢ 55¢ 10¢ 10¢

Wrought Iron—

Cotton..... 50¢ doz \$1.25
 Cotton Pat. (N.Y. Mallet & Hand Wk.)..... 30¢
 Tassel and Picture (T. & S. Mfg. Co.)..... 50¢
 Wrought Staples, Hooks, &c..... See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1886..... 50¢
 Wire Coat and Hat, Miles', list April, 1886..... 50¢
 Indestructible Coat and Hat..... 45¢
 Wire Coat and Hat, Standard..... 60¢
 Handy Hat and Coat..... 50¢ 10¢
 Steady Ceiling Hooks..... 50¢ 10¢
 Belt..... 80¢ 80¢ 10¢
 Atlas, Coat and Hat..... 60¢

Miscellaneous.

Grass, No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50
 Nolin's Grass..... 50¢ doz \$2.25
 Bush..... 55¢ 60¢
 Whiffletree—Patent..... 55¢
 Hooks and Eyes—Malleable Iron..... 70¢ 70¢ 10¢

Hooks and Eyes—Brass..... 60¢ 10¢ 10¢

Fish Hooks, American..... 50¢

Bench Hooks..... See Bench Stops.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

Hose, Rubber—

Competition..... 75¢ 75¢ 5¢
 Standard..... 60¢ 10¢ 5¢ 60¢ 10¢ 10¢
 Extra..... 60¢ 10¢ 60¢
 N. Y. B. & P. Co., Extra..... 25¢ 5¢
 N. Y. B. & P. Co., Extra..... 10¢ 40¢ 5¢
 N. Y. B. & P. Co., Dundee..... 50¢ 10¢ 60¢

Huskers—

Blair's Adjustable..... 50¢ gr \$8.00
 Blair's Adjustable Clipper..... 50¢ gr 7.00
 Hubbard's Solid Steel..... 50¢ gr 4.50

Indurated Fiber-Ware—See

Ware, Indurated Fiber.—

Irons.

Sad—
 From 4 to 10, at factory..... 100¢
 \$2.30 to \$2.40
 Self-Heating..... 50¢ doz \$9.00 net
 Self-Heating, Tailors..... 50¢ doz \$18.00 net
 Mrs. Pott's Irons..... 50¢ 5¢
 Enterprise Star Irons..... 50¢ 5¢
 XX Cold Handle Sad Irons..... 50¢ 5¢

Ideal Irons new list..... 50¢ 10¢ 50¢ 10¢ 10¢
 Salamander, Irons..... 25¢
 R. B. Sad Irons..... 30¢ 35¢
 Combined Fluter and Sad Iron, 40¢
 \$15.00..... 15¢
 Fox Reversible, Self-Fluter 5 doz \$24.00
 Chinese Laundry (N.E. Butt Co.) 8½¢, 15¢
 New England..... 15¢
 Mahony's Troy Pol. Irons..... 25¢
 Sensible..... 20¢ 20¢ 5¢
 National Self-Heating..... 30¢ 5¢

Soldering—

Soldering Coppers..... 20¢ 22¢ 23¢
 Covert's Adjustable, list Jan. 1, 1886..... 35¢ 25¢

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy..... 33½¢
 Victor..... 33½¢

Kettles—

Spun, Stamped,
 Brass, 7 to 17 in., 24¢ 22¢
 Brass larger than 17 in., 26¢ 24¢
 Enameled and Tea—See Hollow Ware.

Keys—

Lock Ass'n list Dec. 30, 1886..... 50¢ 10¢
 Eagle, Cabinet, &c..... 60¢ 5¢
 Hotchkiss' Brass Blank..... 35¢ 25¢
 Hotchkiss' Copper and Tinned..... 40¢
 Hotchkiss' Pad, and Cab..... 35¢
 Ratchet Bed Keys..... 50¢ doz \$4.00, 15¢
 Wollensak Tinned..... 50¢ 10¢

Knife Sharpeners—See Sharpen-

ers, Knife.

Knives.

Butcher, Shoe, &c—
 Wilson's Butcher Knives, list Oct. 1, 1890..... 25¢
 Ames' Butcher Knives..... 25¢
 Foster Bros' Butcher, &c..... 40¢
 Nichols' Butcher Knives..... 40¢ 10¢
 Ames' Shoe Knives..... 20¢ 25¢
 Ames' Bread Knives, 5 doz \$1.50, 15¢ 20¢
 Moran's Shoe and Bread..... 20¢
 Hay and Straw..... See Hay Knives.
 Table and Pocket..... See Cutlery.
 Corn, Auburn Mfg. Co. Western Pat., Corn..... \$2.00
 Corn, Auburn Mfg. Co. Crescent..... \$3.50

Corn—

Bradley's..... 10¢
 Wadsworth's..... 25¢

Drawing—

W. S. & W..... 75¢ 75¢ 10¢
 Mix..... 75¢ 75¢ 10¢
 New Haven..... 60¢ 10¢ 60¢ 10¢ 5¢
 Merrill..... 60¢ 10¢ 60¢ 10¢ 5¢
 Watrous..... 15¢ 10¢ 25¢
 L. & J. White..... 20¢ 5¢
 Bradley's..... 35¢
 Adjustable Handle..... 25¢ 35¢
 Wilkinson's Folding..... 25¢ 25¢ 5¢

Hay and Straw—

Lightning, Mrs. price 50¢ doz \$18.00, 25¢
 But jobbers cut this price freely,
 often selling at \$8 to \$8.50.
 Wadsworth's..... 40¢ 75¢ 40¢ 10¢
 Carter's Needle..... 50¢ doz \$11.00 to \$11.50
 Heath's..... 50¢ doz \$18.00 to \$13.50
 Auburn Hay, Corn, and Spear Point..... 50¢
 Auburn, Straw..... 40¢
 Nolin's Hay..... 50¢ doz \$7.00 to \$8.00

Mining.

Am. (2d quality), 5 gr, 1 blade, \$7;
 2 blades, \$12; 3 blades, \$18..... net
 Lithrop's..... 30¢ 10¢
 Smith's, 5 doz, Single, \$2.00; Double, \$3..... 40¢ 45¢
 Knapp & Cowles..... 50¢ 10¢ 60¢
 Buffalo Adjustable..... 50¢ doz \$3.00, 25¢
 Buffalo Double Adj. table..... 50¢ doz \$3.00, 25¢

Knobs—

Door Mineral..... 60¢ 65¢
 Door Por. Jap'd..... 70¢ 75¢
 Door Por. Nickel..... \$2.00 to \$2.25
 Door Por. Plated, Nickel..... \$2.00 to \$2.25
 Drawer, Porcelain..... 60¢ 10¢ 60¢ 10¢ 10¢
 Hemacite Door Knobs..... 40¢ 10¢ 50¢
 Yale & Towne Wood, list Dec., 1886..... 40¢
 Furniture, Plain, with Guards..... 75¢ gro 10¢ 10¢
 Furniture, Wood Screws..... 25¢ 10¢
 Base, Rubber Tip..... 70¢ 10¢ 5¢
 Picture, Judd's..... 60¢ 10¢ 10¢ 70¢
 Picture, Sargent's..... 70¢ 10¢
 Picture, Hemacite..... 35¢ 5¢
 Shutter, Porcelain..... 65¢ 10¢
 Carriage, Jap'd..... 60¢ 80¢
 Bardsley's Wood Door, Shutter, &c..... 40¢

Ladies—

Melting, Sargent's..... 55¢ 10¢
 Melting, Reading..... 55¢ 10¢
 Melting, Monroe's Pat..... 50¢ doz \$4.00, 40¢
 Melting, P. S. & W..... 35¢ 10¢ 40¢
 Melting, Warner's..... 30¢

Lanterns—

Tubular—
 Plain with Guards, 5 doz..... \$4.00 to \$4.25
 Lift Wire, with Guards..... \$4.50 to \$4.75
 Square Plain, with Guards..... \$4.00 to \$4.25
 Sq. Lift Wire, with Guards..... \$4.25 to \$4.50
 Without Guards, 25¢ 5¢ doz less.

Miscellaneous.

Police, Small, \$6.00; Medium, \$7.25;
 Large, \$9.75..... 20¢ 25¢

Lawn Mowers—See Mowers, Lawn.

Leaders, Cattle.

Humason, Beckley & Co.'s..... 70¢
 Sargent's..... 60¢ 10¢
 Hotchkiss..... 30¢
 Peck, Stow & W. Co..... 60¢ 10¢

Lemon Squeezers—See Squeezers,

Lemon.

Lifters, Transom.

Wollensak's—
 Class 3 and 4, Bronzed Iron..... 50¢
 Class 3 and 4, Bronzed Metal..... 25¢
 Class 3 and 4, Brass..... 35¢
 Skylight Lifters..... 30¢
 Crown, Eagle and Shield..... 50¢
 Reisher's, list Sept. 1, 1890..... 50¢
 Bronzed Iron Rods..... 50¢ 10¢ 10¢ 25¢
 Brass, Real Bronze or Nickel Plate, 30¢

Excelsior..... 50¢ 10¢ 25¢
 Shaw's..... 50¢ 10¢
 Universal..... 60¢
 Solid Grip..... 60¢
 Imperial..... 60¢ 10¢

Lines—

Cotton and Linen Fish, Draper's..... 60¢
 Draper's Chalk..... 60¢
 Draper's Mason's Linen, 84 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25..... 25¢
 Cotton Chalk..... 55¢
 Samson, Cotton, No. 4, \$2; No. 4½, \$2.50; 10¢

Silver Lake, Braided, No. 0, \$4.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50; No. 4, \$8.00; No. 4½, \$8.50..... 45¢
 Mason's Colored Cotton..... 45¢
 Wire Clothes, Nos. 18 to 30..... 50¢
 100 ft. Co. \$4.00 to \$5.00
 Ventilator..... Samson Braided,
 White or Drab Cotton..... 50¢ doz \$7.50, 20¢

Locks, &c.—

Cabinet—
 Eagle, Gaylord Par-; list March, '84, rev-
 ker and Corbin..... Jan. 1, '85, 33½¢ 25¢
 Delta, Nos. 36 to 39..... 40¢
 Delta, Nos. 51 to 63..... 40¢ 10¢
 Delta, Nos. 64 to 99..... 40¢ 10¢
 Stoddard Lock Co..... 30¢ 35¢ 45¢
 "Champion" Night Latches..... 40¢
 Barnes Mfg. Co..... 40¢ 40¢ 10¢
 Eagle and Corbin Trunk..... 25¢ 25¢
 "Champion" Cab. and Combin..... 35¢ 45¢
 Yale..... net prices
 Rome..... 25¢

Door Locks, Latches, &c.

R. & E. Mfg. Co., list Mar. 20, 1889..... 65¢ 10¢ 70¢
 Mallory, Wheeler & Co., list July, '88..... Much lower net
 Sargent & Co., list Aug. 1, '88..... prices often made.
 Reading Hardware Co., list Feb. 2, '88.....
 Brittan, Graham & Mathes, list Jan. 1, 1890..... 60¢ 10¢ 10¢
 Perkins' Burglar Proof..... 60¢ 25¢
 Plate..... 35¢ 25¢
 Barnes Mfg. Co..... 40¢ 40¢ 10¢
 Yale..... net prices
 Delta Flat Key..... 30¢
 L. & C. Round Key Latches..... 30¢ 10¢
 L. & C. Flat Key Latches..... 35¢ 40¢ 10¢
 Rome's Night Latches..... 15¢
 Shephardson or U. S..... 35¢
 Seed's N. Y. Hap Lock..... 25¢

Padlocks—

List Dec. 23, '84..... 75¢ 10¢
 Brittan, Graham & Mathes..... 75¢ 10¢
 Yale Lock Mfg. Co.'s..... net prices
 Eagle..... 25¢ 25¢
 Eureka, Eagle Lock Co..... 40¢ 25¢
 Rome's, Nos. 0 to 91..... 30¢
 Rome's Scandinavian, &c., Nos. 100 to 505..... 15¢
 A. E. Delta..... 40¢
 Champion Padlocks..... 40¢
 Hotchkiss..... 30¢
 Star..... 45¢
 Horseshoe..... 40¢ 40¢ 10¢
 Barnes Mfg. Co..... 40¢ 40¢ 10¢
 Nock's..... 30¢
 Brown's Pat..... 25¢
 Scandinavian..... 60¢ 60¢ 10¢
 E. T. Fram's Keystone Scandinavian..... 40¢ 10¢
 Nos. 119, 130, 138 and 140..... 30¢ 10¢
 Other Nos..... 55¢
 Ames Sword Co. up to No. 150..... 40¢
 Ames Sword Co. above No. 150..... 50¢
 Slaymaker Barry & Co.
 No. 41 line..... 45¢ 25¢
 No. 51 line..... 60¢ 25¢
 No. 51 line..... 75¢ 25¢

Sash, &c.

Clark's, No. 1, \$10; No. 2, \$5 gr..... 33½¢
 Ferguson's..... 33½¢
 Morris and Triumph, list Aug. 16, 1886..... 88¢
 Victor..... 60¢ 25¢
 Walker's..... 10¢
 Atwell Mfg. Co..... 10¢
 Reading..... 60¢ 10¢ 60¢ 10¢ 10¢
 Hammond's Window Springs..... 40¢
 Common Sense, Jap'd, Cop'd and Brsd..... gr \$4.00
 Common Sense, Nickel Plated..... gr \$10.00

Universal

Universal's Gravity..... 80¢
 Kempshall's Model..... 60¢ 60¢ 10¢
 Corbin's Daisy, list Feb. 15, 1886..... 70¢
 Payson's Perfect..... 60¢ 60¢ 10¢
 Huguenin's Sash Balance..... 25¢ 5¢ 25¢
 Huguenin's New Sash Locks..... 35¢ 5¢ 25¢
 Stoddard "Practical"..... 10¢
 Ives' Patent..... 60¢ 10¢ 60¢ 10¢ 5¢
 Liesche's, Nos. 100 and 110, gr \$8; 105, \$10.00..... 30¢ 10¢<

Champion Extra Thin Back Cross
Cuts, $\frac{1}{2}$ foot.....51¢
One Man Champion Cross Cuts, $\frac{1}{2}$ ft.40¢

Atkins' Circular Shingle and Heading dis 50%	
Atkins' Silver Steel Diamond X Cuts foot 70%	
Atkins' Special Steel Dexter X Cuts foot 50%	
Atkins' Special Steel Diamond X Cuts foot 32%	
Atkins' Champion and Electric Tooth X Cuts..... foot 30%	
Atkins' Hollow Head and Drill.....	40%
Atkins' Muley, Mill and Drill.....	40%
Atkins' One-Man Saw, with handles, foot 40%	
Peace Circular and Mill.....	45%
Peace Hand Panel and Rip.....	25%
Peace Cross Cuts.....	45%
Richardson's Circular and Mill.....	45%
Richardson's X Cuts.....	45%
Richardson's Hand, &c.....	25%
C. E. Jennings & Co., Hand, Panel and Rip.....	25%
Hack Saws—	
Griffin's, complete.....	40% to 50%
Griffin's Hack Saw, 40% to 50%	
Star Hack Saws and Blades.....	25%
Eureka and Crescent.....	25%
Scroll—	
Lester, complete, \$10.00.....	25%
Rogers, complete, \$4.00.....	25%
Barnes' Builders' and Cabinet Makers', \$15.....	25%
Barnes' Scroll Saw Blades.....	35%
Saw Frames—See Frames, Saw.	
Saw Sets—See Sets, Saw.	
Saw Tools—See Tools, Saw.	
Scales—	
Hatch, Counter, No. 171, good quality, foot \$21.00	
Hatch, Tea, No. 101.....	50% to 75%
Union Platform, Plain.....	25% to 30%
Union Platform, Striped.....	25% to 30%
Chatillon's Grocers' Trip Scales.....	50%
Chatillon's Eureka.....	25%
Chatillon's Favorite.....	40%
Family, Turnbills.....	30% to 35%
Rieble Bros., Platform.....	40%
Scale Beams—See Beams, Scale	
Scissors, Fluting.....	
45%	
Scrapers—	
Adjustable Box Scraper (S. R. & L. Co.) \$6.50.....	30% to 40%
Box, 1 Handle.....	40% to 50%
Box, 2 Handle.....	40% to 50%
Defiance Box and Ship.....	20% to 30%
Foot.....	50% to 60%
Ship, Common.....	40% to 50%
Ship, R. I. Tool Co.....	10%
Screen Window and Door Frames—See Frames.	
Screw Drivers—See Drivers, Screw.	
Screws.	
Bench and Hand—	
Bench, Iron.....	55% to 60%
Bench, Wood, Beech.....	25% to 30%
Bench, Wood, Hickory.....	20% to 25%
Hand, Wood.....	25% to 30%
Lag, Blunt Point, List Jan. 1, 1890, 75% to 10%	
Coach and Lag, Gimlet Point, List Jan. 1, 1890.....	75% to 10%
Bed.....	25% to 30%
Hand Rail, Sargent's.....	60% to 75%
Hand Rail, H. & B. Mfg. Co., 70% to 75%	
Hand Rail, Am. Screw Co., 60% to 65%	
Jack Screws, Millers Falls List.....	75%
Jack Screws, P. S. & W.....	35%
Jack Screws, Sargent.....	60% to 65%
Jack Screws, Stearns.....	40% to 45%
Cork—	
Humason & Beckley Mfg. Co., 40% to 50%	
Williamson's.....	35% to 40%
Howe Bros. & Hulbert.....	35%
Machine—	
Flat Head, Iron.....	55%
Round Head, Iron.....	50%
Wood—	
List January 1, 1891.	
Flat Head Iron.....	72% to 75%
Round Head Iron.....	67% to 70%
Flat Head Brass.....	72% to 75%
Round Head Brass.....	65% to 68%
Flat Head Bronze.....	72% to 75%
Round Head Bronze.....	65% to 68%
Rogers' Drive Screws.....	33% to 35%
Scroll Saws—See Saws, Scroll.	
Scythes.	
Grain.....	40% to 50%
Grass.....	40% to 50%
Scythe Snaths—See Snaths, Scythe.	
Sets.	
Awl and Tool.	
Aiken's Sets, Awls and Tools, No. 20, foot \$10.00.....	55% to 10%
Fray's Adj. Tool Hds., No. 1, \$12; 2, \$18; 3, \$12; 4, \$9.....	25% to 30%
Miller's Falls Adj. Tool Hds., No. 1, \$12; 2, \$18.....	25%
Henry's Combination Haft.....	25%
Brad Sets, No. 42, \$10.50; No. 43, \$12.50, 70% to 85%	
Stanley's Excelsior.....	65%
No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.....	30% to 35%
Nail—	
Square.....	40% to 45%
Round.....	40% to 45%
Buck Bros.....	27% to 30%
Cannon's Diamond Point.....	40% to 45%
Sheet.	
Regular list.....	50% to 10%
Saw—	
Stillman's Genuine.....	40% to 45%
Stillman's Imita.....	40% to 45%
Common Lever.....	40% to 45%
Morrill's No. 1, \$15.00; Nos. 3 & 4, \$24.00, 40% to 50%	
Leach's, No. 0, \$8.00; No. 1, \$15, 15% to 20%	
Wash.....	20% to 25%

Hammer, Hotchkiss.....	\$5.50, 10%
Hammer, Bemis & Call Co.'s new Pat. 30% to 50%	
Bemis & Call Co.'s Lever and Spring Hammer.....	30% to 50%
Bemis & Call Co.'s Plate.....	10%
Bemis & Call Co.'s Cross Cut.....	12% to 15%
Aiken's Genuine.....	\$13.00, 50% to 10%
Hart's Pat. Lever.....	\$7.00, 55% to 5%
Aiken's Star.....	25%
Leopold.....	40% to 50%
Atkin's Lever.....	40% to 50%
Atkin's Criterion.....	40% to 50%
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00.....	40% to 10%
Avery's Saw Set and Punch.....	50%
Chieftain H. R. Co.'s Superior.....	40% to 50%
Sharpeners, Knife.	
Parkins.	
Applewood Handles.....	40% to 45%
Rosewood or Cocobolo.....	40% to 45%
Shaves, Spoke.	
Iron.....	45%
Wood.....	45%
Railley's Stanley R. & L. Co., 40% to 10%	
Stearns.....	30% to 10%
Cincinnati.....	25% to 10%
Shears—	
American (Cast) Iron.....	75% to 10% to 75% to 10%
Barnard's Lamp Trimmers.....	40% to 35%
Tinners.....	20% to 25%
Seymour's, List, Dec. 1881, 60% to 10% to 60% to 10% to 10%	
Heinrich's, List, Dec. 1881, 60% to 10% to 60% to 10% to 10%	
Heinrich's Tailor's Shears.....	33% to 35%
First quality C. S. Trimmers.....	80% to 80% to 10%
Second quality C. S. Trimmers.....	20% to 25%
Acme Cast Shears.....	80% to 10% to 80% to 10%
Diamond Cast Shears.....	10% to 10%
Clipper.....	10% to 10%
Victor Cast Shears.....	75% to 10% to 75% to 10%
Howe Bros. & Hulbert, Solid Forged Steel.....	40%
Chicago Drop Forge & F. Co., Solid Steel Forged.....	60%
Clauss Shear Co., Japaned.....	70%
Clauss Shear Co., Nickeled, same list. 60%	
Electric.....	List net
Pruning Shears and Hooks.	
Diston's Combined Pruning Hook and Saw.....	40% to 10% to 40% to 10%
Diston's Pruning Hook.....	20% to 10%
E. S. Lee & Co.'s Pruning Tools.....	40%
Pruning Shears, Henry's Pat. \$4.25 \$3.75 to \$4.25 net	
Henry's Pruning Shears.....	4.50 net
Wheeler, M. & C. Co.'s Combination, 40% to 10% to 40% to 10%	
Dunlap's Saw and Chisel.....	20% to 25%
J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25 P. S. & W. Co.....	60%
Tinners, &c.—	
Shears and Snips (P. S. & W.).....	20% to 25%
Snips, J. Mallinson & Co.....	33% to 35%
Sheaves—	
Sliding Door—	
M. W. Co., List July, 1888.....	50% to 10% to 50% to 10%
R. & E., List Dec. 18, 1885.....	55% to 20%
Corbin's List.....	60% to 10% to 60% to 10%
Patent Roller.....	60% to 10% to 60% to 10%
Patent Roller, Hatfield.....	75%
Russell's Anti-Friction, List Dec. 15, 1885.....	60% to 25%
Moore's Anti-Friction.....	50%
Sliding Shutter—	
R. & E., List Dec. 18, 1885.....	60% to 10% to 60% to 10%
Sargent's list.....	60% to 10% to 60% to 10%
Reading list.....	60% to 10% to 60% to 10%
Ship Tools—	
L. & I. J. White.....	20% to 25%
Shoes, Horse, Mule, &c.—	
Horse—	
Burden's, Perkins', Phoenix, at factory. 4.00	
Mule—	
Add \$1 key to above prices.	
Ox, Wrought—	
Ton lots.....	40% to 50%
1000 lb. lots.....	40% to 50%
500 lb. lots.....	40% to 50%
Shot—	
(Eastern prices 2% off, cash, 5 days.)	
Drop, 40 bag, 25 lb.....	1.36
Drop, 40 bag, 5 lb.....	.32
Buck and Chilled, 40 bag, 25 lb.....	1.61
Buck and Chilled, 40 bag, 5 lb.....	.37
Shovels and Spades—	
Ames' Shovels, Spades, &c., List Nov. 1, 1885.....	20%
Note.—Jobbers frequently give 5% to 7% extra on above.	
Griffith's Black Iron.....	50% to 10%
Griffith's C. S.....	60% to 10%
Griffith's Solid S. B. R. Goods.....	20%
St. Louis Shovel Co.....	20% to 25%
Hussey, Bluns & Co.....	15% to 25%
Hubbard & Co.....	20% to 25%
Lehigh Mfg. Co.....	50% to 10%
Payne, Pettibone & Son.....	30% to 35%
Remington's Lowman's Pat.....	40% to 45%
Rowland's, Black Iron.....	50% to 10%
Rowland's Steel.....	60% to 65%
Shovels and Tongs—	
Iron Head.....	60% to 10% to 60% to 10%
Brass Head.....	60% to 10% to 60% to 10%
Sieves—	
Mann's Tin Rim.....	50% to 25%
Buffalo Metallic, S. S. & Co.....	50% to 25%
Shaker (Barier's Pat.) Flour Sieves.....	40% to 45%
Electric.....	40% to 45%
A. & W. Sievers.....	40% to 45%
Hunter's.....	40% to 45%
Smith's Adjustable Sievers.....	40% to 45%

Smith's Adjustable Milk Strainer.....	\$2.00
Smith's Adjustable T. & C. Strainer.....	\$1.25
Staves, Wooden Rim—	
Mesh 18, Nested, foot.....	80%
Mesh 20, Nested, foot.....	95%
Mesh 24, Nested, foot.....	\$1.15
Skells, Thimble—	
Western list.....	75% to 75% to 10%
Columbus Wrt. Steel, Special net price.....	60%
Coldbrookdale Iron Co.....	60%
Utica P. S. T. Skells.....	60%
Utica Turned and Fitted.....	35%
Slates—	
School, by case.....	50% to 10% to 50% to 10%
Snaps, Harness, &c.—	
Anchor (T. & S. Mfg. Co.).....	65%
Fitch's (Bristol).....	60% to 10%
Hotchkiss.....	10%
Andrews.....	50%
Sargent's Patent Guarded.....	70% to 10% to 10%
German, new list.....	40% to 10%
Covert.....	50% to 25%
Covert, New R. E.....	60% to 25%
Covered Spring.....	60% to 10% to 10%
Snaths, Scythe.	
List.....	50% to 10% to 50% to 10%
Soldering Irons—See Irons, Solder- ing.	
Spittoons, Cuspidors, &c.	
Standard Fiberglass—	
Cuspidors, 8 1/2-in., foot, No. 5, 88; No. 5X, 90	
Spittoons, Daisy, 8-in., No. 1, \$4; 10 and 11 in., \$6.	
Spoke Shavers—See Shaves, Spoke.	
Spoke Trimmers—See Trimmers, Spoke.	
Spoons and Forks—	
Tinned Iron—	
Basting, Cen. Stamp, Co.'s list.....	70% to 10%
Solid Table and Tea, Cen. Stamp, Co.'s list.....	70% to 10%
Buffalo S. S. & Co.....	33% to 25%
Silver-Plated—(4 mos. or 5% cash 30 days.)	
Meriden Brit. Co., Rogers.....	40% to 15%
C. Rogers & Bros.....	40% to 15%
Rogers & Bros.....	40% to 15%
Reed & Barton.....	40% to 15%
Wm. Rogers Mfg. Co., 40, 15% to 5%	
Simpson, Hall, Miller & Co.....	40, 15% to 5%
Holmes & Edwards Silver Co., 40, 15% to 5%	
L. Boardman & Son.....	50% to 12% to 5%
Miscellaneous.	
Holmes & Edwards Silver Co.: No. 67 Mexican Silver.....	50% to 10% to 5%
No. 30 Silver Metal.....	50% to 10% to 5%
No. 24 German Silver.....	50% to 10% to 5%
No. 50 Nickel Silver.....	50% to 10% to 5%
No. 4 Nickel Silver.....	50% to 10% to 5%
W. Rogers Mfg. Co., Rogers' Silver Metal.....	50, 10% to 5%
18% Rogers' German Silver.....	60% to 5%
22% Rogers' Nickel Silver.....	50% to 5%
German Silver.....	50% to 5%
German Silver, Hall & Elton.....	50% to 5%
German Silver.....	50% to 5%
Britannia.....	60%
Boardman's N'ck'l Silver.....	40% to 7% to 5% cash
Boardman's Britannia spoons, case lots.....	50% to 12% to 5% cash
Springs—	
Door—	
Torrey's Rod, regular also.....	40% to 13%
Gray, 4 in., \$20.00.....	20%
See Red 4 in., \$20.00.....	20%
Warner's No. 1, 4 in., \$2.50; No. 2, \$3.30.....	40% to 10% to 50%
Gem Coll, list April 19, 1886.....	10%
Star Coll, list April 19, 1886.....	20%
Victor Coll.....	60% to 10% to 60% to 10%
Champion Coll.....	60% to 10% to 60% to 10%
Philadelphia, 5 in., \$5.00; 8 in., \$7.75; \$15.00.....	50%
Cowell's.....	40% to 10% to 40% to 10%
Rubber, complete, foot, \$4.50.....	55% to 10%
Hercules.....	50%
Shay Door Check and Spring.....	25% to 30% to 35%
Carriage, Wagon, &c.—	
Elliptic, Concord, Platform and Ball Scroll.....	60% to 10% to 10%
Cliff's Bolster Springs.....	25%
Squares—	
Steel and Iron.....	80% to 10%
Nickel-Plated.....	80% to 10%
Try Square and T Bevels.....	60% to 10% to 60% to 10%
Diston's Try Square and T Bevels.....	80%
W. B. Waterbottom's Try and Miter.....	30% to 10%
Starrett's Micrometer Calliper Squares.....	25%
Avery's Fluted Bevel Squares.....	40%
Avery's Bevel Protractor.....	50%
Squeezers.	
Fodder—	
Blair's.....	40% to 20%
Blair's "Climax".....	40% to 12%
Lemon—	
Porcelain Lined, No. 1.....	40% to 60%
Wood, No. 2.....	40% to 30%
Wood, Common.....	40% to 30%
Dunlap's Improved.....	40% to 30%
Sammis.....	40% to 30%
\$18 per doz.....	25% to 10%
Jennings' Star.....	40% to 25%
The Boss.....	40% to 25%
Dean's, Nos. 1, 40% to 60%; 2, \$3.50; 3, \$1.00; Queen, \$1.50	
Little Giant.....	40% to 50%
King.....	40% to 50%
Hotchkiss Straight Flash.....	40% to 12%
Silver & Co., Glass.....	40% to 30%
Standard Fiber Ware—See Ware, Standard Fiber.	
Staples.	
Blind—	
Barbed, 3 in. and larger.....	70% to 10%
Barbed, 3 in.....	70% to 10%

Fence Staples, Galvanized.....	Same Price as R.R. Wire.
Fence Staples, Plain.....	See Trd. Rep.
Steelyards.....	40&10&50&
Stocks and Dies—	
Blacksmith's	
Waterford Goods.....	40&40&10&
Butterfield's Goods.....	40&40&10&
Lightning Screw Plate.....	25&30&
Reece's New Screw Plates.....	33&35&40&
Reversible Ratchet.....	30 &
Gardner.....	30&
Stops, Bench.	
Morrill's.....	40&50&
Hotchkiss's.....	40&50&10&10&
Weston's, No. 1, \$10; No. 2, \$9.25 to 10%	
McGill's.....	40&50&
Cincinnati.....	25&10&
Stone—	
Hindustan No. 1, 3 1/2; Axe, 3 1/2; Slips No. 1, 4 1/2	
Sand Stone.....	20&21&
Washita Stone, Extra.....	20&21&
Washita Stone, No. 1.....	15&16&
Washita Stone, No. 2.....	11&12&
Washita Slips, No. 1, Extra.....	37&40&
Washita Slips, No. 1.....	25&26&
Arkansas Stone, No. 1, 4 to 6 in.....	15&16&
Arkansas Stone, No. 1, 6 to 9 in.....	15&16&
Turkey Oil Stone, 4 to 8 in.....	40&
Turkey Slips.....	10&10&10&
Lake Superior, Chase.....	10&
Lake Superior Slips, Chase.....	10&32&
Seneca Stone, Red Paper Brand.....	18&20&
Seneca Stone, High Rounds.....	20&25&
Seneca Stone, Small Whets.....	20&24&00
Stove Polish—See Polish, Stove.	
Stretchers, Carpet.	
Cast Steel, Polished.....	40&22&
Cast Iron, Steel Points.....	40&80&
Socket.....	40&11&
Jaulard's.....	35&25&10&
Strops, Razor—	
Genuine Emerson.....	60&60&5&
Imitation ".....	40&20&10&5&
Torrey's.....	20&
Bader's Belt and Com.....	20&
Lamont Combination.....	40&40&
Jordan's Pat Padded, list Nov. 1, '89.....	20&50&
Electric.....	List net
Stuffers or Fillers, Sausage—	
Miles' "Challenge," 40&20&50&50&5&	
Perry.....	40&20&10&15&00&0&
Drake Luf. No. 4, Ranch \$30.00.....	50&2&50&10&
Enterprise Mfg. Co.....	20&10&30&
Silver's.....	40&10&
Sweepers, Carpet.	
Bissell No. 5.....	40&17&00
Bissell No. 7 New Drop Pan.....	40&19&00
Bissell, Grand.....	40&33&00
Grand Rapids.....	40&24&00
Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00.....	
Magie.....	40&16&00
Jewel.....	40&17&00
Improved Parlor Queen.....	40&17&00
Nickeloid.....	40&27&00
Japanned.....	40&24&00
Excelator.....	40&22&00
Garland.....	40&18&00
Parlor Queen.....	40&24&00
Housewife's Delight.....	40&15&00
Queen.....	40&16&00
Queen, with band.....	40&18&00
King.....	40&30&00
Weed, Improved.....	40&18&00
Hub.....	40&16&00
Cog-Wheel.....	40&16&00
Chaqueur.....	40&22&00
Easy.....	40&22&00
Monarch.....	40&22&00
Goshen.....	40&21&00
Tacks, Brads, &c.—	
List Oct. 19, 1889. Standard Weights.	
Carpet Tacks—	
American Iron, Blued.....	77&1&
American Iron, Tind or Cop'd.....	77&1&
Steel, Plain or Bright.....	75&
Steel, Tinned or Coppered.....	75&
Swedes Iron, Blued.....	73&
Swedes Iron, Tinned or Cop'd.....	73&
American Iron Cut Tacks.....	75&
Swedes Ir. Uphol's'r Tacks, Blued.....	75&
Swedes Iron Uphol'sters' Tacks.....	75&
Tinned.....	75&
Gimp and Lace Tacks, Blued.....	75&
Gimp and Lace Tacks, Tinned.....	77&1&
Swedes Iron Basket or Trimmers' Tacks.....	70&10&
Miners' Tacks.....	77&1&
Bill-Posters' or Railroad Tacks.....	75&
Bill-Posters' or Railroad Tacks.....	75&
Tinned.....	77&1&
Copper Tacks.....	40&
Copper Finish & Trunk Nails.....	40&
Cigar Box Nails.....	40&
Fire Glaziers' Points.....	50&
Picture-Frame Points.....	50&
Loose-Glass Tacks.....	50&
Brush Tacks.....	40&
Tin-Capped Trunk Nails.....	40&
Finishing Nails.....	70&
Trunk and Clout Nails, Black and Tinned.....	75&
Common and Patent Brads.....	75&
Hungarian Nails.....	70&
Basket and Chair Nails.....	65&
Leathered Carpet Tacks.....	40&
Miscellaneous—	
Double-Pointed, 120 count.....	55&10&
Wire Carpet Nails.....	50&10&
Plymouth Rock Steel Carpet Tacks.....	20&

Extra 10 @ 10&10 &

Wire Brads & Nails, see Nails, Wire.
Steel-Wire Brads, B. & E. Mfg. Co.'s
list.....50&105

Tapes, Measuring—

American.....40&405
Spring.....405
Chesterman's, Regular list.....26&305

Thermometers—

Tin Case.....80&80105

Thimble Skeins—See Skeins.

Ties, Rail—Steel

Standard Wire, list.....50&105

Tinners' Shears, &c.—See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Plead, list
Jan. 20 1887.....70&105

Tire Benders, Upsetters, &c.— See Benders and Upsetters, Tire.

Tools.

Coopers'—

Bradley's.....205
Barton's.....20&205
L. & J. White.....205
Albertson Mfg. Co.....255
Beatty's.....305
Sandusky Tool Co.....30&305
Rhaves, Cincinnati Tool Co.....205

Lumber.

Ring Peavies, "Blue Line".....\$ doz 20.90
Ring Peavies, Common.....\$ doz 18.00
Steel Socket Peavies.....\$ doz 21.00
Mail Iron Socket Peavies.....\$ doz 19.00
Cant Hooks, "Blue Line".....\$ doz 16.00
Cant Hooks, Common Finish.....\$ doz 14.00
Cant Hooks, Mail Socket Clasp, "Blue
Line" Finish.....\$ doz 16.00
Cant Hooks, Mail Socket Clasp, Com-
mon Finish.....\$ doz 14.50
Cant Hooks, Clip Clasp, "Blue Line"
Finish.....\$ doz 14.00
Cant Hooks, Clip Clasp, Common Fin-
ish.....\$ doz 12.00
Hand Spikes.....\$ doz 6 ft., \$15.00; 8 ft.,
\$20.00
Pike Poles, Pike & Hook, \$ doz, 12 ft.,
\$11.50; 14 ft., \$12.50; 16 ft., \$14.50;
18 ft., \$17.50; 20 ft., \$21.50.
Pike Poles, Pike only, \$ doz, 12 ft.,
\$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18
ft., \$16.00; 20 ft., \$20.00.
Pike Poles, not ironed, \$ doz, 12 ft.,
\$9.00; 14 ft., \$7.00; 16 ft., \$9.00; 18
ft., \$12.00; 20 ft., \$16.00.
Setting Poles, \$ doz, 12 ft., \$14.00; 14
ft., \$15.00; 16 ft., \$17.00
Swamp Hooks.....\$ doz \$18.00

Saw.

Atkins' Perfection.....\$ doz \$12.00
Atkins' Excelsior.....\$ doz \$6.00
Atkins' Giant.....\$ doz \$4.00

Tobacco Cutters—See Cutters, To- bacco.

Transom Lifters—See Lifters, Transom.

Traps—

Game—

Newhouse.....40&405
Onida Pattern.....70&105
Game, Blake's Patent.....40&105

Mouse and Rat—
Mouse Wood Choker, \$ doz holes, 11&12
Mouse, Round Wire.....\$ doz \$1.50, 105
Mouse, Cage, Wire.....\$ doz \$2.50, 105
Mouse, Catch-tem-alive.....\$ doz \$2.50, 155
Mouse, Bonanza.....\$ doz \$0.00&\$1.00
Mouse, Delusion.....\$ gr \$1.00&\$1.25
Rat, Decoy.....\$ gr \$1.00, 105
Ideal.....\$ gr \$1.00
Cyclone.....\$ gr \$5.25
Hotchkiss Metallic Mouse, 5-hole traps,
\$ doz, 100 ft. in full cases, \$ doz.....755
Hotchkiss Imp. Rat Killer.....\$ gro \$18.50
Hotchkiss New Rat Killer.....\$ gro \$16.50
Schuyler's Rat Killer.....\$ gro \$15.00

Trimmers.

Butter and cheese.....255

Trimmers, Spoke.

Bonney's.....\$ doz \$10.00, 505
Stearns'.....\$ doz \$10.00, 20&105
Ives, No. 1, \$15.00; No. 2, \$12.00 \$ doz.
55&105
Douglas'.....\$ doz \$9.00, 205
Cincinnati.....255

Trowels—

Lothrop's Brick and Plastering.....20&105&355
Reed's Brick and Plastering.....155
Dianston's Brick and Plastering.....255
Peace's Plastering.....355
Clement & Maynard's.....205
Rose's Brick.....155&205
Brade's Brick.....255
Worral's Brick and Plastering.....205
Garden.....705

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list, '82.....405

Tubes, Boiler—

See Pipe.

Twine—

Flax Twine— BC. B.
No. 9, 1/4 and 1/2 B Balls.....255 345
No. 12, 1/4 and 1/2 B Balls.....255 355
No. 18, 1/4 and 1/2 B Balls.....255 365
No. 24, 1/4 and 1/2 B Balls.....255 375
No. 30, 1/4 and 1/2 B Balls.....255 385
No. 264, Matraas, 1/4 and 1/2 B Balls.....525 545
Chalk Line, Cotton, 1/4 B Balls.....255
Mason Line, Linen, 1/4 B Balls.....555
2-Ply Hemp, 1/4 and 1/2 B Balls (Spring
Twine).....155
3-Ply Hemp, 1 B Balls.....165 165
3-Ply Hemp, 1 1/2 B Balls.....165 165
Cotton Wrapping, 5 Balls to 1.....155 165
2, 3, 4 and 5-Ply Jute, 1/4 B Balls.....105
Wool.....65 65
Paper.....155 165
Cotton Mops, 6, 9, 12 and 15 B to dos.....155

Vices—

Solid Box.....50&105 50&105
Parallel—
Flaher & Norris Double Screw.....155 105
Stephens.....255 305
Parker's.....205 255
Howard's.....355
Bonney's.....405 105
Miller's Falls.....405 105
Trenton.....405 105
Merrill's.....155 205
Sargent's.....605 105 105
Hague and Union.....405
Double Screw Leg.....155 105
Prentiss.....205 255
Simpson's Adjustable.....405
Moore's.....205

Saw Mlrs—

Bonney's, Nos. 2 & 3, \$15.00.....405 105
Stearns'.....535 105 535 105
Stearns' Silent Saw Vices.....535 105 535 105

Sargent's.....605 105
Hopkins.....\$ doz \$17.50, 105
Reading.....405 105
Wentworth.....205 105
Miscellaneous—
Combination Hand Vices.....\$ gr \$42.00
Cowell Hand Vices.....205
Bauer's Pipe Vices.....105
Cincinnati.....255 105
Enterprise Pipe Vices, each.....\$3.00

Wagon Boxes—See Boxes, Wagon.

Washer Cutters—See Cutters Washer.

Ware, Hollow, Enamelled, &c.

Cast Iron, Hollow—
Stove Hollow-Ware—
Ground.....555 555 605 555
Unground.....655 105 655 105 555
White Enamelled Ware—
Boilers and Saucepans.....405
Tinned Boilers and Saucepans.....405
Rustless Hollow-Ware.....505 505 555
Gray Enamelled Ware—
Stove.....505
Mashin Kettles.....605 105 105
Boilers and Saucepans.....405 555
Enamelled—
Agate and Granite Ware, list Jan. 1,
1889.....335 105
Ironclad Enamelled Ware.....dis 335 105

Kettles

Galvanized Tea-Kettles—
Inch.....6 7 8 9
Each.....555 605 655 755

Standard Fiber—

Wash-Basins, 10 1/2 in.....\$2.00 \$2.25
Wash-Basins, 12 in.....2.25 2.75
Keelers, 1 1/4 in.....4.00
Cuspidors.....4.00
Spittoons, "Daisy," 8 in.....4.00 4.50
Peck Measure.....4.00
Half-peck Measure.....3.50
See also Pails.

Indurated Fiber—255

Spittoons, No. 2, \$ doz.....\$9.00
Basins, Ringed, \$ doz, No. 2, \$4.20;
No. 3.....\$4.20
Washbuts, Nested, Nos. 0, 1, 2 and 3 (4
pieces), \$ nest.....\$7.50
Keelers, Nested, Nos. 1, 2, 3 and 4 (4
pieces), \$ nest.....\$3.70
Butter Bowls 15, 17 and 19-Inch (3
pieces), \$ nest.....\$2.25
Liquid Measures, pt, qt, 2 qt. and fun-
nell (4 pieces) \$ set.....\$3.00
Dry Measures, 1, 2, 4, 8 and 16 qts. (5
pieces), \$ set.....\$3.00
See also Pails.

Silver Plated, Hollow—

4 mo. or 5 \$ cash in 30 days.
Reed & Barton.....
Meriden Britannia Co.....405 555
Simpson, Hall, Miller & Co.....
Rogers & Brother.....
Hartford Silver Plate Co.....405 555
William Rogers Mfg. Co.....

Washers—

Size hole.....5-16 3/4 1/2 5/8 to 1 1/2
Washers.....6 5 2.9 2.65
In lots less than 200 B, \$ B, add 1/4 \$, 5-B
boxes 1¢ to list.

Wedges—

Iron.....\$ B 3/4
Steel.....\$ B 4

Weights, Sash—

Solid Eyes.....\$ ton \$18&\$19

Well Buckets, Galvanized—See Buckets, Well, Galvanized.

Wheels, Well.

8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.25

Wire and Wire Goods—

Iron—

Market.
Br. & Ann'd, Nos. 0 to 18.....755
Cop'd, Nos. 0 to 18.....725
Galv., Nos. 0 to 18.....655
Tin'd, Tinned list Nos. 0 to 18.....655
Stone.
Br. & Ann'd, Nos. 16 to 18.....755
Bright and Ann'd, Nos. 19 to 26.....775
Br. & Ann'd, Nos. 27 to 36.....805
Tinned.....
Tinned Broom Wire, 18 to 21, \$ B.....555
Galvanized Fence, Nos. 8 and 9.....675
Annealed Fence, Nos. 8 and 9.....775
Annealed Grape, Nos. 10 to 18.....775
Brass, list Jan. 18, 1884.....305
Copper, list Jan. 18, 1884.....305
Barb Fence.....See Trade Report
Annealed Wire on Spools.....605
Main's Steel and Tin'd on Spools.....405
Main's Brass and Cop. on Spools.....405
Cast Steel Wire.....605
Stub's Steel Wire.....\$6.00 \$2.30
Steel Music Wire, 12 to 30.....605 705
Wire Clothes Lines, see Lines.
Wire Picture Cord, see cord.

Bright Wire Goods—

Standard list.....855

Wire Cloth and Netting.

Painted Screen Cloth, good quality,
\$ 100 sq. ft., \$1.40 \$1.45
Galvanized Wire Netting.....70&105

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable.....405
Baxter's Adjustable "S".....405 105 505
Baxter's Diagonal.....405 105 505
Coe's "Genuine".....505 555
Coe's "Mechanics".....505 105 555
Girard Standard.....655 105
Lamson & Sessions' Engineers'.....605 105
Lamson & Sessions' Standard.....705 105
P. S. & W. Agricultural.....755 5 75
Girard Agricultural.....\$10
Lamson & Sessions' Agrie'l.....\$10
Bemis & Call's
Pat. Combination.....355
Merrick's Pattern.....355
Briggs' Pattern.....355
Cylinder or Gas Pipe.....405 555
No. 3 Pipe.....405 105
Aiken's Pocket (Bright).....\$5.00, 505 105
The Favorite Pocket.....\$ doz \$4.00, 405
Webster's Pat. Combination.....255
Boardman's.....205 105
Always Ready.....255 555
Alligator.....505
Donohue's Engineer.....205 105
Acme, Bright.....505 555
Acme, Nickle.....405 555
Hercules.....705
Walker's.....555 555
Diamond Steel.....555 555
Cincinnati Vise Wrenches.....555 105
Taff's Vise Wrench.....555 105 555

Wringers, Clothes—

List September 20, 1890, 25 cash.

Wrought Goods—

Staples, Hooks, &c., list Jan. 12, 1886,
80&15&555

PAINTS, OILS AND COLORS.—Wholesale Prices.

Animal and Vegetable Oils.

Linsed, City, raw, per gal. 56 @ 62
Linsed, City, boiled.....61 @ 65
Linsed, Western, raw.....54 @ 61
Lard, City, Extra Winter.....52 @ 53
Lard, City, Prime.....49 @ 50
Lard, City, Extra No. 1.....45 @ 48
Lard, City, No. 1.....42 @ 43
Lard, Western, prime.....42 @ 48
Cotton-seed, Crude, prime.....27 @ 28
Cotton-seed, Crude, off
grades.....18 @ 22
Cotton-seed, Summer Yel-
low, prime.....33 @ 34
Cottonseed, Summer Yel-
low, off grades.....274 @ 30
Sperm, Crude.....70 @ 72
Sperm, Natural Spring.....68 @ 69
Sperm, Bleached Spring.....72 @ 74
Sperm, Natural Winter.....70 @ 71
Sperm, Bleached Winter.....70 @ 71
Whale, Crude.....
Whale, Natural Winter.....
Whale, Bleached Winter.....
Whale, Extra Bleached.....
Sea Elephant, Bleached
Winter.....
Menhaden, Crude, Southern.....
Menhaden, Crude, Southern.....
Menhaden, Light Pressed.....
Menhaden, Bleached W'ter.....
Menhaden, Extra Bleached.....
Tallow, City, prime.....
Tallow, Western, prime.....
Cocoanut, Ceylon.....
Cocoanut, Ceylon.....
Cod, Domestic.....
Cod, Foreign.....
Red Elaine.....
Red Saponified.....
Bank.....
Straita.....
Olive, Italian, bbls.....
Neatfoot, prime.....
Palm, prime, Lagos.....

Mineral Oils.

Black, 20 gravity, 25 @ 30
cold test.....per gal 8 1/2 @ 9
Black, 20 gravity, 15 cold
test.....9 @ 9 1/2
Black, 20 gravity, summer.....7 @ 7 1/2
Cylinder, light, filtered.....15 1/2

Cylinder, dark, filtered.....14 @ 20
Cylinder, dark, s'm refined 10 @ 18
Paraffine, 23 1/2 @ 24 gravity. 12 1/2 @ 13
Paraffine, 25 gravity.....11 1/2 @ 12
Paraffine, 28 gravity.....10 1/2 @ 11
Paraffine, red, 21 @ 22 grty 14 1/2 @ 15
Paraffine, red, 23 1/2 @ 24 grty 12 1/2 @ 13

Paints and Colors.

Barytes, Prime White.....\$ ton \$21.00 @ 22.50
Barytes, Amer. refined.....20.00 @
Barytes, Amer. No. 1.....18.00 @
Barytes, Amer. No. 2.....16.00 @
Barytes, Amer., off-color.....13.00 @ 15.00
Blue, Celestial.....6 @ 8
Blue, Chinese.....6 @ 8
Blue, Prussian.....25 @ 40
Blue, Ultramarine.....10 @ 30
Brown, Spanish.....36 @ 1
Brown, Vandyke, Amer.....3 @ 3 1/2
Brown, Vandyke, English.....8 @ 10
Black, American Drop.....12 @ 14
Black, English Drop.....12 @ 14
Black, Frankfurt, Drop.....5 @ 18
Black, Lamp, common.....12 @ 18
Black, Lamp, medium.....19 @ 25
Black, Lamp, prime.....27 @ 35
Carmine, No. 40, in bulk.....3.10 @
or barrels.....8.20 @
Carmine, No. 40, in ounce
bottles.....4.20 @
Chalk, in bulk.....\$ ton 2.50 @ 2.75
Chalk, in bbls.....\$ 100 B 30 @ 35
China Clay, English.....\$ ton 12.00 @ 18.00
Cobalt Oxide, prep'd.....2.90 @
Cobalt Oxide, black.....lots 100 B 2.60 @
Cobalt, Oxide, black.....less 100 B 2.65 @
Green, Paris, in bulk.....14 @ 14 1/2
Green, Paris, 170 @ 175 B 14 @ 14 1/2
Green, Paris, small pack.....16 @ 21
Green, Chrome, ordinary.....8 @ 13
Green, Chrome, pure.....22 @ 35
Lead, Eng. B.B. white.....9 @ 10
Lead, Ann. White, dry or in oil:
Kegs, lots less than 1000 B.....\$7 1/2
Kegs, lots 1000 B to 5 tons.....\$6 1/2
Kegs, lots 5 tons to 12 tons.....\$6 1/2
Kegs, lots 12 tons and over.....\$6 1/2
Lead, White, in oil, 25 B tin

pails, add to keg price.....@ 3/4
Lead, White, in oil, 12 1/2 B tin.....@ 1
pails, add to keg price.....@ 1
Lead, White, in oil, 1 to 5 B as-
sorted tins, add to keg price.....@ 2 1/2
Lead, Red, bbls, and 1/2 bbls.....@ 7
Lead, Red, kegs.....@ 7 1/2
Litharge, kegs.....@ 7 1/2
Litharge, bbls, and 1/2 bbls.....@ 7

TERMS, &c.—Lead and Litharge.—On
lots of 1000 B or over, 60 days' time or
2 1/2 % discount for cash if paid within 15
days of date of invoice.

Ocher, Rochelle.....1.35 @ 1 1/4
Ocher, French Washed.....1 1/4 @ 1 1/2
Ocher, German Washed.....1 1/4 @ 1 1/2
Ocher, American.....1 1/4 @ 1 1/2
Orange Mineral, English.....9 @ 9 1/2
Orange Mineral, French.....9 1/2 @ 10
Orange Mineral, German.....8 1/2 @ 9 1/2
Orange Mineral, American.....8 @ 8 1/2
Paris White, English Cliff-
stone.....90 @ 1.10
Paris White, American.....70 @ 80
Red, Indian, English.....5 1/2 @ 7
Red, Indian, American.....2 @ 6
Red, Turkey.....9 @ 14
Red, Tuscan.....9 @ 11
Red, Venetian, American.....\$ 100 B 1.00 @ 1.35
Red, Venetian, English.....1.25 @ 1.75
Sienna, Italian, Burnt and
Powd. \$ B.....5 @ 6 1/2
Sienna, Ital., Burnt Lumps.....1 1/4 @ 3 1/2
Sienna, Ital., Raw, Powd.....1 @ 1 1/2
Sienna, Ital., Raw Lumps.....2 @ 3
Sienna, American, Raw.....1 1/4 @ 1 1/2
Sienna, American, Burnt
and Powdered.....1 1/4 @ 1 1/2
Talc, French.....1 1/4 @ 1 1/2
Terra, American.....\$ 100 B 72 1/2 @ 80
Terra Alba, English.....80 @ 85
Terra Alba, American No. 1.....70 @ 75
Terra Alba, American No. 2.....38 @ 40
Umber, Turkey, Bnt. and
Powd.....3 1/2 @ 4
Umber, Turkey, Bnt. Amer.....2 1/4 @ 3
Umber, Turkey, R'w Amer.....1 1/4 @ 1 1/2
Umber, Turkey, R'w Amer.....1 1/4 @ 1 1/2
Yellow, Chrome.....10 @ 25
Vermilion, Americ. Lead.....11 1/2 @ 17

Vermilion, Quicks'er, bulk.....@ 75
Vermilion, Quicks'er, bags.....@ 76
Vermilion, Quicksilver,
smaller pkgs.....@ 80
Vermilion, English Import.....82 1/2 @ 85
Vermilion, imitation, Eng.....82 1/2 @ 85
Vermilion, Trieste.....87 1/2 @ 90
Vermilion, Chinese.....90 @ 95
Whiting, Common, \$ 100 B 40 @ 45
Whiting, Gliders'.....60 @ 65
Zinc, American, dry.....45 @ 5
Zinc, French, Red Seal.....@ 8 1/2
Zinc, French, Green Seal.....@ 8 1/2
Zinc, French, V. M. X.....@ 7
Zinc, Antwerp, Red Seal.....@ 7 1/2
Zinc, Antwerp, Green Seal.....@ 8 1/2
Zinc, German, L. Z. O.....@ 6 1/2
Zinc, V. M. in Poppy Oil, O.
Seal, lots of 1 ton and
over.....10 1/2 @ 11 1/2
lots less than 1 ton.....11 @ 11 1/2
Zinc, V. M. in Poppy Oil,
Red Seal.....@ 10 1/2
lots of 1 ton and over.....10 @ 10 1/2
lots of less than 1 ton.....10 1/2 @ 10 1/2
Discounts.—French Zinc.—Discounts
to buyers of 10 bbl. lots of one or as-
sorted grades, 1 %; 25 bbls, 2 %, 50 bbls,
4 %. No discount allowed on less
than bbl. lots.

Colors in Oil.

Blue, Chinese.....\$ B 35 @ 40
Blue, Prussian.....29 @ 45
Blue, Ultramarine.....12 @ 18
Brown, Vandyke.....7 @ 12
Brown, Chrome.....7 @ 13
Green, Paris.....16 @ 18 1/2
Sienna, Raw.....7 @ 13
Sienna, Burnt.....7 @ 13
Umber, Raw.....7 @ 10
Umber, Burnt.....7 @ 10

Spirits Turpentine.

in regular bbls.....39 @ 39 1/4
in machine bbls.....39 1/4 @ 40

Glue.

Low Grade.....\$ B 8 @ 10
Cabinet.....12 @ 14
Medium White.....13 @ 15
Extra White.....17 @ 20
French.....16 @ 18
English.....10 @ 1
Irish.....12 @ 1

